the OIL AND GAS JOURNAL

PRICE 50 CENTS TABLE OF CONTENTS PAGE 37 JANUARY 7, 1952

WELLS were cemented from a horse-drawn wagon thirty years ago. That's how Halliburton began. There soon proved to be a great need for the service Halliburton performed, and the oil industry gave its approval to the *quality* of Halliburton's service. Today, Halliburton is a large organization with highly-trained men and modern equipment helping to produce oil in every part of the world where wells are drilled. That's progress by consent of the industry. But, no matter how well a service is performed, or however great the demand for it, Halliburton will consistently and energetically work for further improvement of its service.

"THERE'S NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING"

HALLIBURTON OIL WELL CEMENTING CO.

DUNCAN, OKLAHOMA

For Truly Balanced Performance

EQUIP YOUR RIG WITH ALL THESE BETHLEHEM COMPONENTS

For smoothest, fastest, most trouble-free operation, all drilling-rig components should work in complete harmony. Bethlehem makes this possible with matched sets of crown and traveling blocks, swivels, and rotary tables. From Bethlehem's wide assortment you can select the combination that meets your needs exactly.

CROWN BLOCKS—4 sizes. Capacities, 80 to 350 tons.

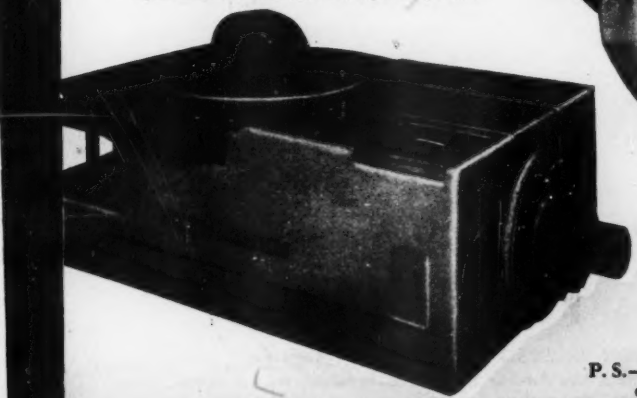
TRAVELING BLOCKS—4 sizes. Capacities, 80 to 350 tons.

SWIVELS—4 sizes. Capacities, 60 to 300 tons.

ROTARIES—2 sizes, 17½-in. and 21-in. Capacities to 18,000 ft with 4½-in. drill pipe. Also available as unitized outfits with Hydrodrive and independent prime mover.

BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Export Distributor: Bethlehem Steel Export Corporation



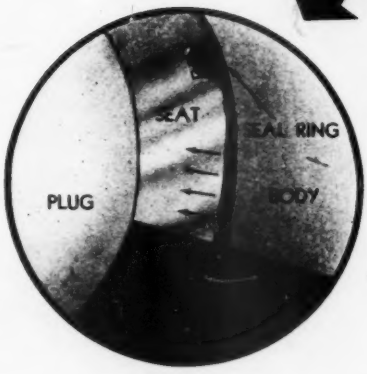
P. S.—No space left to talk about Bethlehem's full line of power pumps and drawworks. But we'll be glad to send you all the information you want.

Pressure Forces Improve the Seal...

effects of body distortion eliminated

Body distortion will cause ordinary valves to leak because the action of pressure forces and line strains tend to separate the sealing surfaces. To bridge this separation, a viscous lubricant is usually injected into the valve. However, lubrication to maintain a seal is not required in the Cameron Lift-Plug Valve since pressure forces act to improve rather than to destroy the seal.

Illustrated herewith is a section through a Cameron Life-Plug Valve in the closed position. The plug is firmly wedged into the seat during the final step of the actuator motion and a primary metal-to-metal seal is secured. Then, as shown in the circled enlargement, line pressure (indicated by red) exerts forces on an exterior portion of the seal to press it into even closer sealing contact with the plug.



Cameron

NON-LUBRICATED LIFT-PLUG VALVES

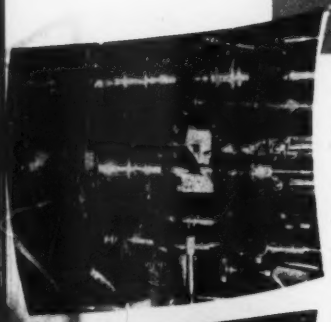
CAMERON IRON WORKS, Inc. P. O. Box 1212 Houston, Texas

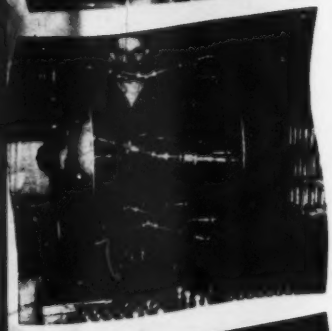
Export: 74 Trinity Place, New York, N. Y. Represented in sterling area by: British Oilfield Equipment Co., Ltd., Duke's Court, St. James's, London S.W. 1, England.

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.

Is there any real difference in Balls and Seats?

...emphatically YES!





1. IN MACHINING AND HEAT-TREATING OF SEATS. "Oilwell" seats are machined and drilled to exact tolerances on automatic machinery—then heat-treated in electrically controlled and heated furnaces with controlled atmosphere to produce physical properties that are uniformly correct, before lapping.

2. IN AUTOMATIC LAPPING OF BALLS AND SEATS. "Oilwell's" technical engineers have designed an exclusive lapping process that automatically assures extremely accurate matings of each ball-and-seat set.

3. IN ACCURACY OF CONTOUR AND SIZE OF BALLS. "Oilwell," like most ball-and-seat manufacturers, buys balls by specification from specialists in ball manufacture. Balls are carefully checked by "Oilwell" for size and perfection of spherical contour . . . and thoroughly tested under pressure with their mating seats before packaging.

Unwrap any "Oilwell" ball-and-seat set and notice how snugly the ball and seat fit together. Contact surfaces between the two parts approach perfection from "Oilwell's" precision lapping . . . and seat bodies are finished inside and out to extremely close tolerances, well within the strict limits of A.P.I. specifications.

In addition, "Oilwell" balls and seats are available in several materials which have the proper chemical composition and physical characteristics to give you maximum performance under various service conditions.

	MATERIAL	HARDNESS	RECOMMENDED SERVICE
Type T	Tool Steel	Best	Extremely resistant to abrasion where corrosion is not a problem—the industry's favorite for low-cost service.
Type C	Hardened Stainless Steel	Good	Top quality low-metalloid stainless, has good resistance to both abrasion and corrosion.
Type K	Monel	Medium	Has excellent corrosion resisting properties with average resistance to abrasion—non-magnetic.
Type B	Bronze	Low	Hardened aluminum-bronze, non-magnetic with considerable corrosion resistance (brine) at low cost.
"Malloy"	Extra Hard Stainless Steel	High	High hardness stainless steel ball and seat combination for corrosive wells, with considerable abrasion resistance—unsurpassed for general service.

SHOP "OILWELL" FIRST . . . for all your maintenance, repair and operating supplies.

OIL WELL SUPPLY DIVISION
UNITED STATES STEEL COMPANY

Executive Office—DALLAS, TEXAS
Export Division Office—
30 ROCKEFELLER PLAZA
NEW YORK 20, N. Y.

Division Offices—CALGARY, CANADA
CASPER, WYOMING . . . COLUMBUS, O.
DALLAS, TEXAS . . . HOUSTON, TEXAS
TULSA, OKLA. . . . LOS ANGELES, CALIF.

USS "OILWELL"

UNITED STATES STEEL

KEY-KAST

alloy welding fittings . . .

eered for longer life

- **Greater wall thickness throughout**
- ***Extra* thickness in critical areas**

Give *your* piping system these advantages of KEY-KAST Alloy Steel Welding Fittings!

- Greater allowance against erosion and corrosion—with extra thickness at critical areas.
- Increased structural strength—with greater wall thickness throughout.
- Lower unit cost.
- Meet A.S.M.E., ASTM, ASA Codes.
- Bosses provided for tapped openings.
- Controlled quality . . . through rigid metallurgical control . . . produced . . . inspected . . . tested in *one* plant.

Produced in low . . . intermediate . . . and various stainless steels in all shapes, sizes and schedules.

NEW BULLETIN gives complete facts on the new Key-Kast line. Send for your copy today. (Please make request on your letterhead.)

PROMPT DELIVERIES!
Wire or write your alloy fitting needs.

Key Company

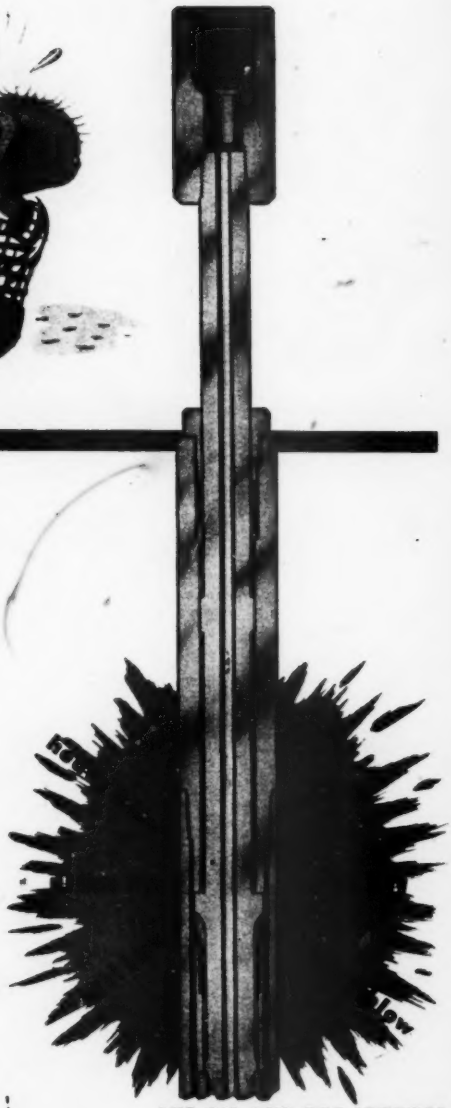
P. O. BOX 494-A • EAST ST. LOUIS, ILLINOIS

Since 1916 . . . Pioneers in Developing and Manufacturing Products for High Pressures and Temperatures.

DISTRICT OFFICES: NEW YORK • CLEVELAND • CHICAGO • TULSA • HOUSTON • LOS ANGELES

Jarring Jerry

The right jar for the job at hand



THE JOHNSTON-SUTLIFF HYDRAULIC JAR

A Jar that hits any desired blow, at any time, to meet any condition—without pulling out of the hole.

Write For Descriptive Literature!

JOHNSTON

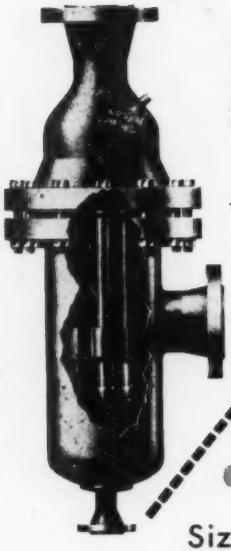
SHOOT-FISH

M. O. JOHNSTON OIL FIELD SERVICE CORPORATION
3035 Andrita Street — Los Angeles 65, California
"Servicing California & Rocky Mountains"

M. O. JOHNSTON OIL FIELD EXPORT CORPORATION
3035 Andrita Street — Los Angeles 65, California
"Exclusive Export Sales"

AEROTEC

DRY GAS SCRUBBERS



One of five Aerotec installations for Central Hudson Gas and Electric Co., Poughkeepsie, N. Y. Six more units are on order for this company.

Remove dusts, liquids and distillates with *high efficiencies*

Sizes for every well and pipeline need

Collection efficiency on natural gas impurities is extremely high with Aerotec Gas Scrubbers. Proven time after time in tests and day after day in actual service, these units solve one of the oil-gas industry's most difficult precipitating problems. The Aerotec *dry* process thoroughly rids the gas stream of dusts, liquids, and distillates. You are never troubled by carryover of oil or other cleaning mediums, as with conventional types of scrubbers.

Operating on the principle of separation by centrifugal force, Aerotec Scrubbers precipitate foreign materials from the gas by passing it through multiple, small-diameter tubes. In overall design, these units are lightweight, compact, and simplified for easy installation. Available in standard units up to 100,000,000 SCFD, Aerotec Scrubbers can be manifolded to provide for unlimited capacities.

Our representatives, backed by Aerotec's long experience in solving problems of air and gas cleaning, are ready to serve you at any time. Our Catalog 501 also offers you helpful details. Call or write.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.

(Offices in 28 Principal Cities)

Canadian Affiliates T. C. CHOWN, LTD., Montreal 25, Quebec; Toronto 3, Ontario

Manufacturers

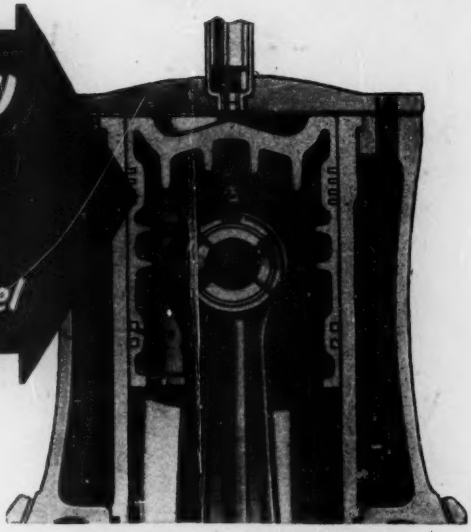
THE AEROTEC CORPORATION

GREENWICH, CONN.

MURPHY GIVES YOU

MORE ECONOMY
SMOOTHER OPERATION
GREATER DEPENDABILITY
EASIER STARTING

because it's a "True" Diesel



ILLUSTRATED at the right in cross section is the combustion chamber of the Murphy Diesel. Note that it is plain and open with no artificial devices to effect combustion. In operation, completely atomized liquid fuel is sprayed directly into all parts of the air charge by means of the unit injector located in the center of the combustion chamber. Since the fuel burns immediately upon injection into the incandescent air charge, combustion is controlled solely by the unit injector, which in turn is precisely controlled by the hydraulic servo-type governor. This is "true" diesel operation.

To the Murphy owner it means more power from each drop of fuel and less wear and tear on the engine . . . lower costs in all ways.

More details on "true" diesel operation as well as other Murphy features are given in the booklet "10 Questions to Ask a Diesel Engine Salesman." Ask your Murphy Diesel Dealer for a copy or write direct.

MURPHY DIESEL COMPANY
5305 W. Burnham St., Milwaukee 14, Wisconsin
TULSA OFFICE—Sales, Parts, Service:
113-117 South Elwood Street, Tulsa, Oklahoma

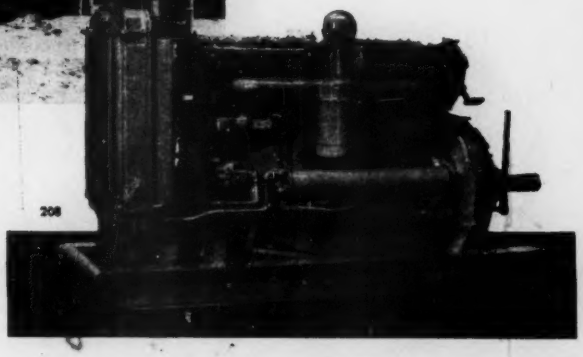
SALES, PARTS AND SERVICE: Los Angeles, California; Mt. Vernon, Illinois; Evansville, Indiana; Great Bend, Kansas; Jackson, Michigan; Tulsa, Oklahoma; Amarillo, Dallas, Houston, Lubbock and San Antonio, Texas; Edmonton, Alberta, Canada

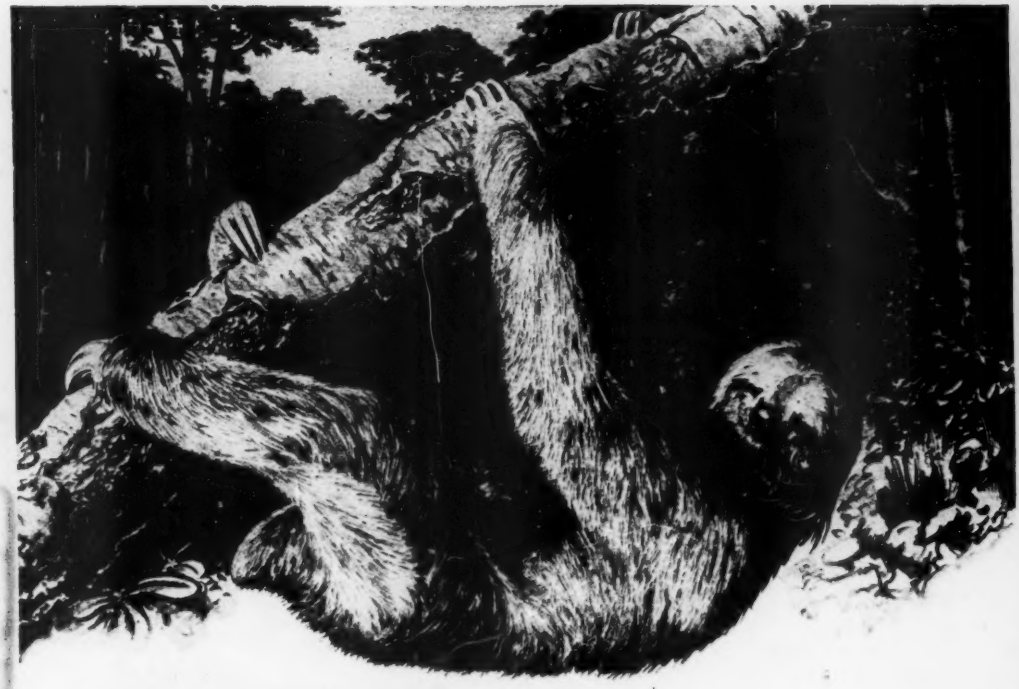
Illustrated is a Unit 15 rig and Emsco mud pump powered by three Murphy Diesels each rated at 160 H.P. continuous, 180 H.P. intermittent. When photographed, the rig, which is owned by Aztec Drilling Co., was drilling for natural gas in the vicinity of Lindreth, New Mexico.

MURPHY DIESEL

Heavy duty power
for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.





in WIRE ROPE, too load strain calls for SPECIALIZED muscles

Everything looks upside down to the three-toed sloth. Unique among animals, he prefers to live his life dangling downward from the top branches of tall trees. Helping him to survive in his topsy-turvy world are highly specialized and powerfully developed rear and forelimb muscles.

In wire rope, too, specialized jobs call for the right kind of muscle. Load strain! Bending fatigue! Shock stress! Abrasion! Each calls for wire rope that best combines the required resistance characteristics.

Complete quality control from ore to finished rope; long experience and specialized know-how—these are your assurance that in Wickwire Rope you always get the proper combination of physical properties for long-lasting, reliable service on your particular job.

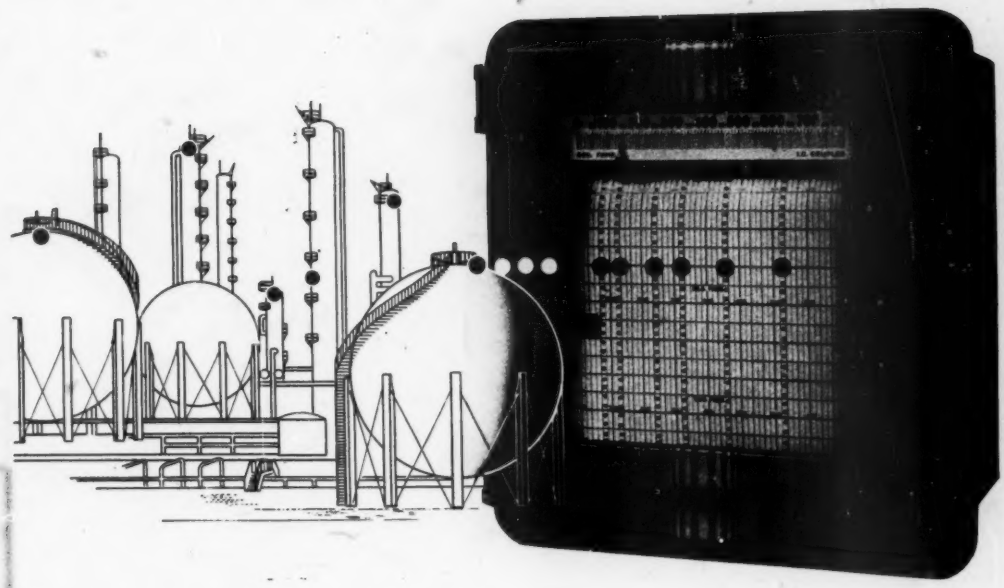
For additional information write or phone our nearest sales office.

THE COLORADO FUEL & IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New York • Philadelphia

LOOK FOR THE YELLOW TRIANGLE ON THE REEL

WICKWIRE ROPE

CF&I



A new temperature Fact every 2 sec!

Today, when many refinery operations may need temperature facts within seconds instead of minutes, the Speedomax story is worth knowing:

For a Speedomax Multiple-point instrument's record-printing "wheel" darts from temperature to temperature in just 2 seconds per point! Thus, if there are, say, 15 fairly important temperatures on a single refinery unit, each one can actually come up and be recorded as often as twice per minute, automatically and continuously.

Two extra checks for vital temps

But suppose a few points require even closer watching, or more frequent recording? Speedomax handles them, too, in either of two ways:

First, they can be recorded more frequently than the other points, in such a sequence as 1, 2, 1, 3, 1, 4, etc.

Second, the vital points can be recorded in greater detail than the other points. This is done by giving the instrument an additional range which is used only with the pre-selected points. This range puts far fewer degrees-per-inch across the instrument's scale; it thus "spreads" the reading for detail.

Ability to measure temperature from any source and across either wide ranges or the new narrow ranges is another L&N specialty. Selection among thermocouples, Thermohms and Rayotubes will determine the correct sensing element. Selection among various recorder components will put the information on paper in the desired form.

160 temps on one instrument

For these and many more features . . . for instance, 160-point models . . . credit Speedomax's refined, stable, dependable construction, both electrical and mechanical. Too, Speedomax is not affected by vibration; never needs levelling up; can measure many quantities besides temperature.

Any L&N office, including 4959 Stenton Ave., Phila. 44, Pa., will send the Speedomax story on request.

LEEDS NORTHRUP

Jrl. Ad. ND46-700(2)

Proved
by nearly a half-century of progress

In 1952... backed by nearly 50 years of continuous service and development... Spicer-designed Universal Joints are being used in a majority of the automotive vehicles made throughout the world. The unique and original design of Spicer Universal Joints... embodying features of high efficiency... has made this unit the Standard of the Industry.

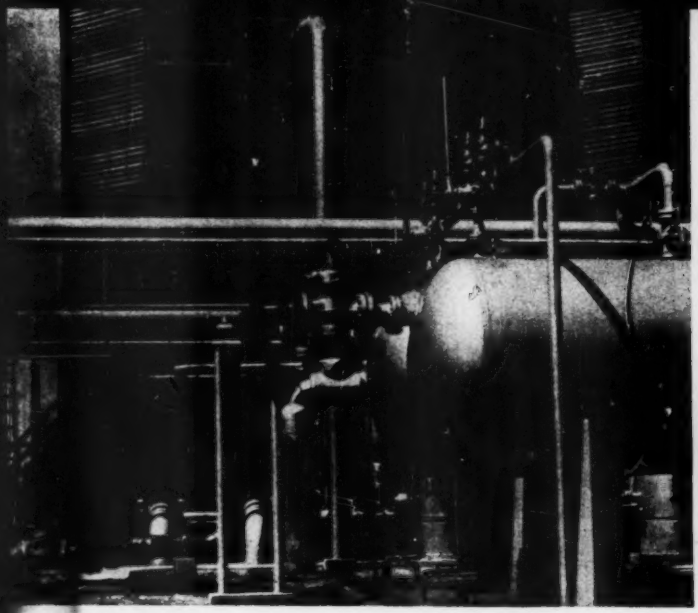
- Sliding splines have ground finish on ALL contact surfaces, extra hardness, and iron manganese phosphate coating.
- True bearing alignment with rigid one-piece yoke design. *This rigidity is the essence of accuracy.*
- Precision bearings with improved surface hardness and finish.
- Dynamically balanced to exacting limits.
- Uniform high quality propeller shaft tubing. *Steel meets our special specifications.*
- Wide selection of flange and yoke types and sizes to suit each individual requirement.

48 YEARS OF **Spicer** SERVICE

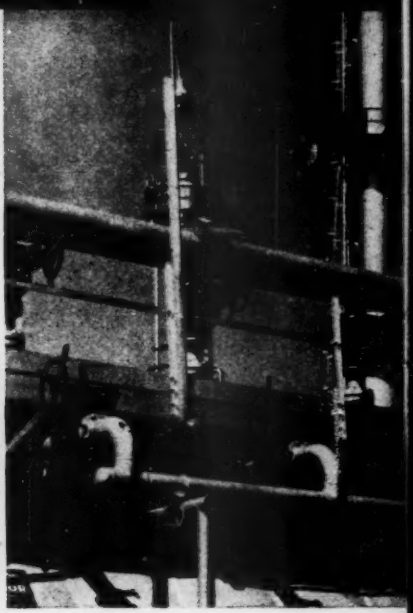
SPICER MANUFACTURING
Division of Dana Corporation • TOLEDO 1, OHIO

TRANSMISSIONS • UNIVERSAL JOINTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • PASSENGER CAR AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES

Q:



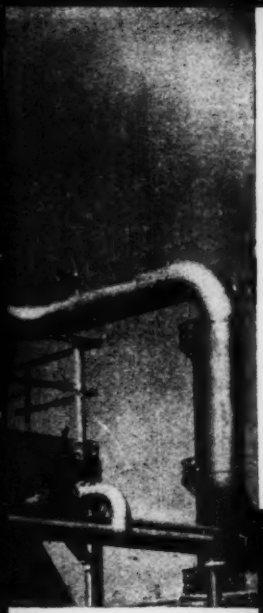
TREATERS— Manifold of Nordstrom valves on Perco gasoline treaters which take hydrogen sulphide and other impurities out of gasoline.



COOLING TOWERS— Lines carrying gas vapors to debutanizer overhead cooler are fitted with Nordstroms.

PUMP LINES— Insulated Nordstrom valves used on pump intake and discharge processing lines.

TANK STORAGE— Battery of Nordstrom valves control flow of gasoline, butane, and propane from storage to loading racks.



For the varied services in a gasoline plant Nordstroms are by far the most commonly used valves. Typical locations for Nordstrom valves are debutanizer, instrument, pump, dehydrator, scrubber, separator, treater, absorber, lean oil, deethanizer, oil heater, cooling tower, metering, compressor, gathering, storage and loading rack lines, to mention only a few.

Because Nordstrom valves are built for all pressure-temperature conditions encountered in a gasoline plant, because the range of Nordstrom sizes, materials and body styles is the most complete obtainable, because Nordstroms stay tight in service on hard-to-hold gases and petroleum derivatives, most of today's most efficient gasoline plants have standardized on Nordstrom lubricant sealed valves.

Here are just a few examples of the hundreds of Nordstrom applications in a *single Oklahoma gasoline plant.*

Where are Nordstrom Valves used in a Gasoline Plant?

A:

INSTRUMENT AIR LINES—Nordstrom valves on lines carrying instrument air to the air starting tank.

SURGE LINES—Rich oil from absorbers flows through these Nordstrom equipped lines to rich oil surge tanks for mixing.

Nordstrom Valves

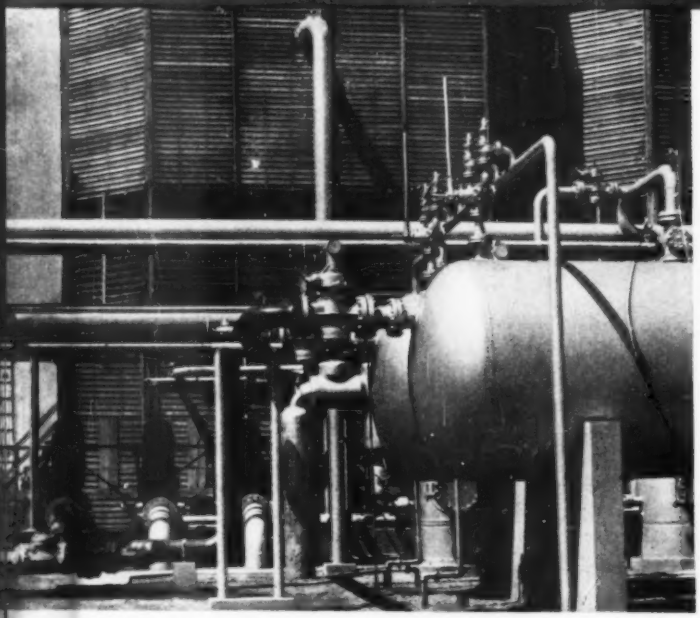
LUBRICANT SEALED TO KEEP UPKEEP DOWN

Another Rockwell Product

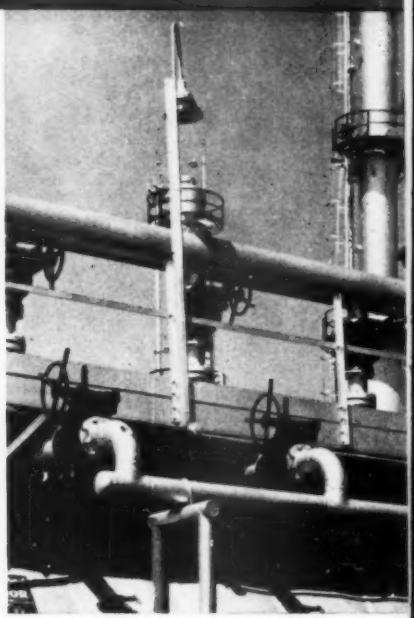
Rockwell MANUFACTURING COMPANY

400 N. Lexington Ave., Pittsburgh 8, Pennsylvania

Q: Where are Nordstrom Valves



TREATERS— Manifold of Nordstrom valves on Perco gasoline treaters which take hydrogen sulphide and other impurities out of gasoline.

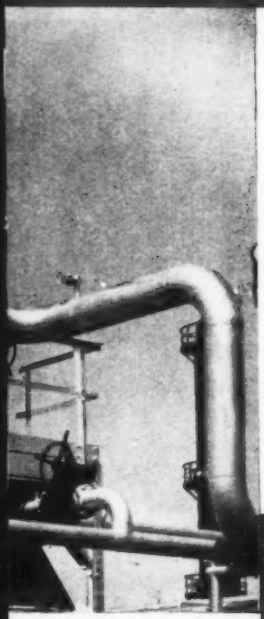


COOLING TOWERS— Lines carrying gas vapors to debutanizer overhead cooler are fitted with Nordstroms.

PUMP LINES— Insulated Nordstrom valves used on pump intake and discharge processing lines.

TANK STORAGE— Battery of Nordstrom valves control flow of gasoline, butane, and propane from storage to loading racks.

Used in a Gasoline Plant?



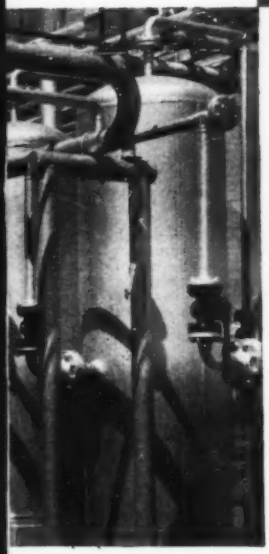
For the varied services in a gasoline plant Nordstroms are by far the most commonly used valves. Typical locations for Nordstrom valves are debutanizer, instrument, pump, dehydrator, scrubber, separator, treater, absorber, lean oil, deethanizer, oil heater, cooling tower, metering, compressor, gathering, storage and loading rack lines, to mention only a few.

Because Nordstrom valves are built for all pressure-temperature conditions encountered in a gasoline plant, because the range of Nordstrom sizes, materials and body styles is the most complete obtainable, because Nordstroms stay tight in service on hard-to-hold gases and petroleum derivatives, most of today's most efficient gasoline plants have standardized on Nordstrom lubricant sealed valves.

Here are just a few examples of the hundreds of Nordstrom applications in a *single Oklahoma gasoline plant.*

Where are Nordstrom Valves used in a Gasoline Plant?

A: Everywhere!



INSTRUMENT AIR LINES—Nordstrom valves on lines carrying instrument air to the air starting tank.

SURGE LINES—Rich oil from absorbers flows through these Nordstrom equipped lines to rich oil surge tanks for mixing.

Nordstrom Valves

LUBRICANT SEALED TO KEEP UPKEEP DOWN

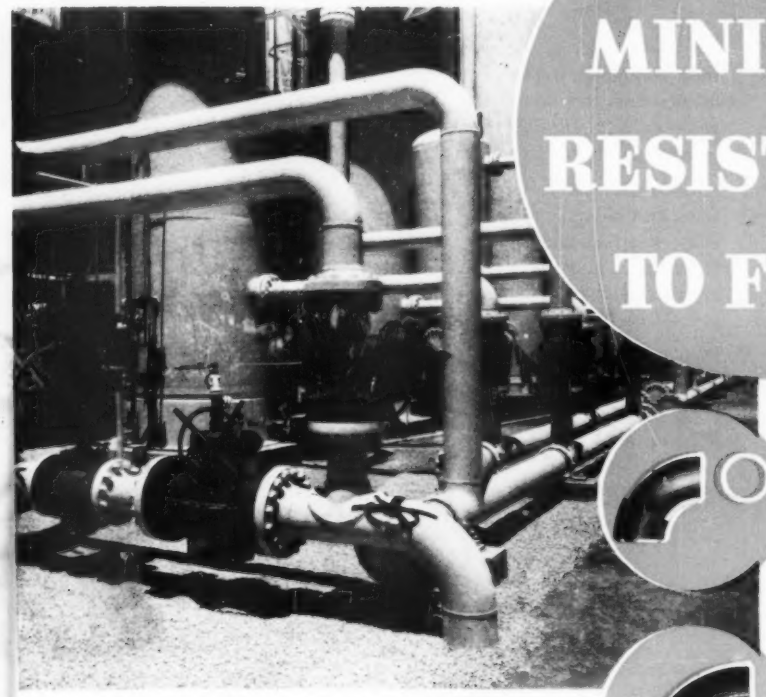
Another ROCKWELL Product

Rockwell MANUFACTURING COMPANY

400 N. Lexington Ave., Pittsburgh 8, Pennsylvania

Grinnell Welding Fittings for

MINIMUM RESISTANCE TO FLOW



Grinnell Welding Fittings on towers of natural gasoline plant.

Any qualified welder can make welds quickly and easily with Grinnell welding fittings. These fittings are made by a hydraulic forging process that assures uniform wall thickness at all points and true circularity throughout. Of seamless, one-piece construction, they can be cut at any angle to match up with standard weight, extra strong and heavier wall pipe in I. D. or O. D. sizes. Pressure-temperature ratings are equal to or greater than those of seamless steel pipe. Grinnell welding fittings are process stress-relieved.

Full data on the complete line of Grinnell carbon steel butt welding fittings and forged steel flanges is contained in the Grinnell Welding Fittings Catalog.

SEND FOR THIS CATALOG

TRUE CIRCULAR SECTION

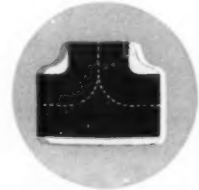
True circular section at all points makes a Grinnell fitting easy to align and weld . . . no distortion or flattening to affect flow adversely.

FULL EFFECTIVE RADIUS

Pressure loss through Grinnell welding elbows is held to a minimum because of the full, effective sweep of the radius.

SMOOTH, CLEAN INSIDE SURFACE

Grinnell fittings have uniformly smooth inner walls . . . no waves or ridges to cause turbulence or accelerate erosion or corrosion. No pockets to trap solids or foreign matter.



EASY, SWEEPING TURNS

In Grinnell welding tees, the corners where the outlet joins the run are well-rounded and perfectly smooth to minimize resistance to flow and to prevent trapping.

GRINNELL

WHENEVER PIPING IS INVOLVED

GRINNELL COMPANY, INC., Providence, R. I. Warehouses: Atlanta • Billings • Buffalo • Charlotte • Chicago Cleveland • Cranston • Fresno • Kansas City • Houston • Long Beach • Los Angeles • Milwaukee • Minneapolis • New York Oakland • Philadelphia • Pocatello • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

. . . the cycle is never completed at NATIONAL SUPPLY

Just as the oil industry keeps moving ahead at a rapid pace so is the tempo of research and development increased at National Supply. Throughout the oil fields of the world, where so many important advancements are in progress, the field representatives of National Supply are in constant touch with changing practices and expanding needs.

As new drilling and production equipment is developed and tested it is made available by National Supply through its stores and its representatives throughout the world—your reliable single source of supply for drilling and production machinery, diesel and gas engines, tubular products, and operating supplies and equipment.

Throughout the oil country you'll find everything that's new and everything that's standard at National Supply.

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO

BLUE

NATIONAL IDEAL RIGS

Characteristic of the "Ideal" Rigs in this group are such features as:

TORQUE CONVERTER DRIVE—Incorporates the load-speed compensating characteristics of fluid-drive transmissions for drum, rotary table and pump.

LARGE DIAMETER DRUMS—Designed for maximum service of wire lines.

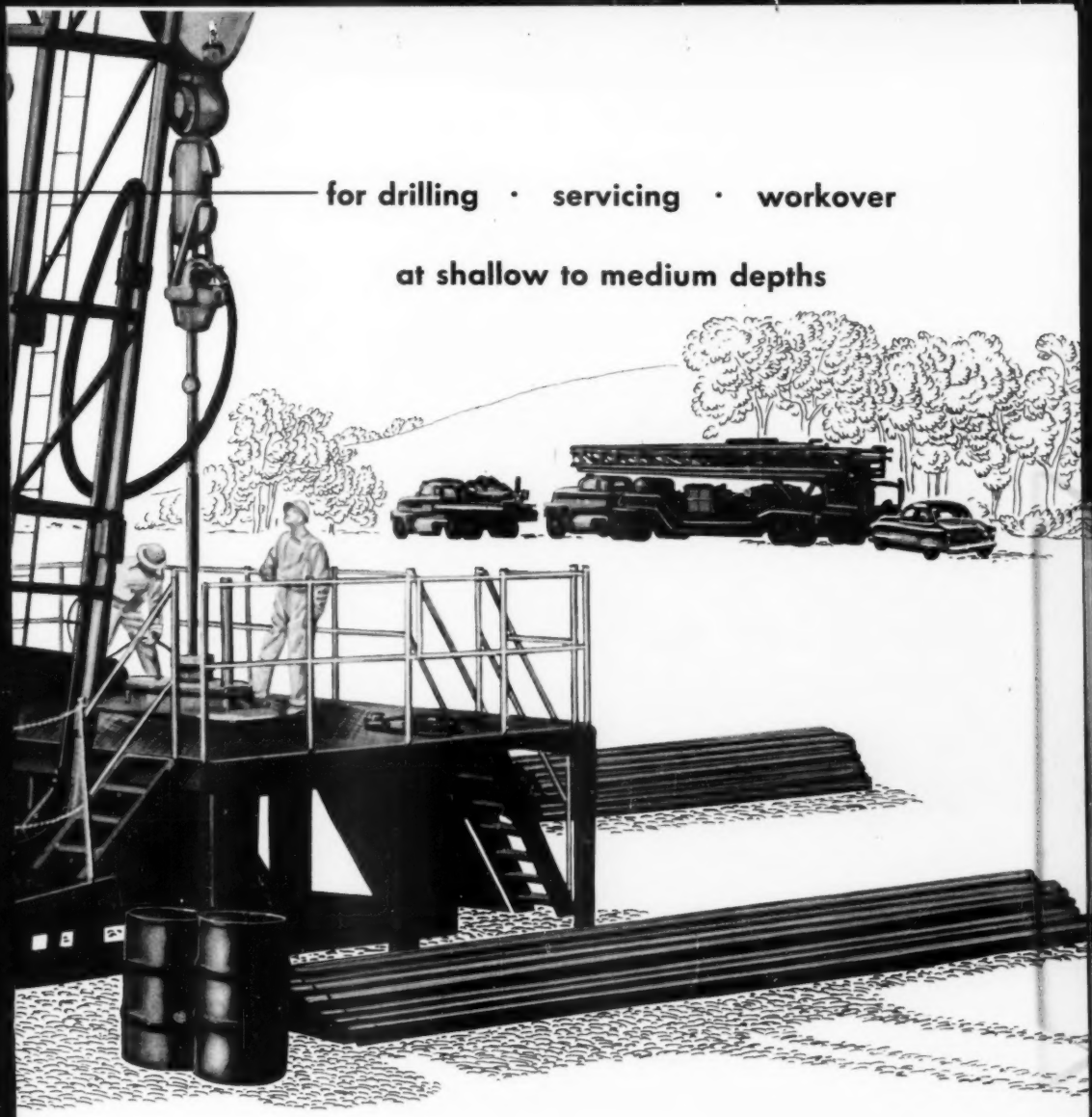
AIR-ACTUATED CLUTCHES—For control of drums, rotary and pump drive.

CENTRALIZED OPERATING CONTROLS—Equipment arranged so that all controls are within easy reach of driller's position.

FREE-RUNNING SPOOLING DRUM—Insures fast fall of light-weight empty blocks.

EQUALIZING BRAKES ON HOISTING DRUM—Smooth braking action is assured by the well-known "Ideal" design which incorporates replaceable brake rims of heat-treated alloy steel.

SIMPLIFIED LUBRICATION SYSTEM—Conveniently arranged and readily accessible lubricating points facilitate routine maintenance.



for drilling · servicing · workover

at shallow to medium depths

Recent developments in the design of National "Ideal" Rigs resulted in an increase in the service range and utility of three units which are particularly well-suited for shallow to medium depth drilling, as well as for servicing and workover.

This group of three rigs includes the T-12, T-20 and T-32 with input power ratings of 120 h.p., 200 h.p. and 320 h.p. respectively. They are especially constructed so that equipment sub-assemblies can be readily transported on regular highway vehicles, or integrally mounted on trailers.

Descriptive bulletins on each of these small "Ideal" Rigs are available. To assist you in selecting the proper equipment, tell us your drilling needs.

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES: TOLEDO, OHIO

Division Offices: Casper; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance

Canada: The National Supply Company, Limited, 702 Barron Building, 610 Eighth Avenue, West, Calgary, Alberta

Export: National Supply Export Corporation, 600 Fifth Avenue, New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London, E.C. 2

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT · SPANG STEEL PIPE · SUPERIOR & ATLAS ENGINES

NATIONAL BLUE PRODUCTS

the right pumping unit . . . for every well . . . everywhere . . .

National Pumping Units are built that way—in a range of sizes for every pumping operation, and ready for service in any climate.

They're built that way because National's research and product development programs are completely integrated with the requirements of operators in every major oil field throughout the world.

The operating efficiency and durability of National Pumping Units are the direct result of this practical relationship.

Construction and application details of the various sizes of National Pumping Units are contained in a series of bulletins you'll need in order to select the proper units. Write for them—as well as for complete information on other types of National and "Ideal" drilling and production equipment.

THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICES, TOLEDO, OHIO

Division Offices: Casper, Ft. Worth, Houston, Pittsburgh, Tulsa, Torrance

Canada: The National Supply Company, Limited, 702 Barron Building, 610 Eighth Avenue, West, Calgary, Alberta

Export: National Supply Export Corporation, 600 Fifth Avenue, New York 20, N.Y., U.S.A., River Plate House, 12 South Place, London, E.C. 2

NATIONAL BLUE PRODUCTS

New gas engine on TIMKEN® bearings is small in size...big in results

THIS new Ajax Iron Works gas engine was designed to give the oil industry a light-duty pumping engine which, in spite of its small size, would offer these advantages: dependable operation, long life in the field and freedom from troublesome service problems. It has a 5" bore and 6½" stroke with a piston displacement of 128 cu. in. Compression ratio is 5.6 to 1.

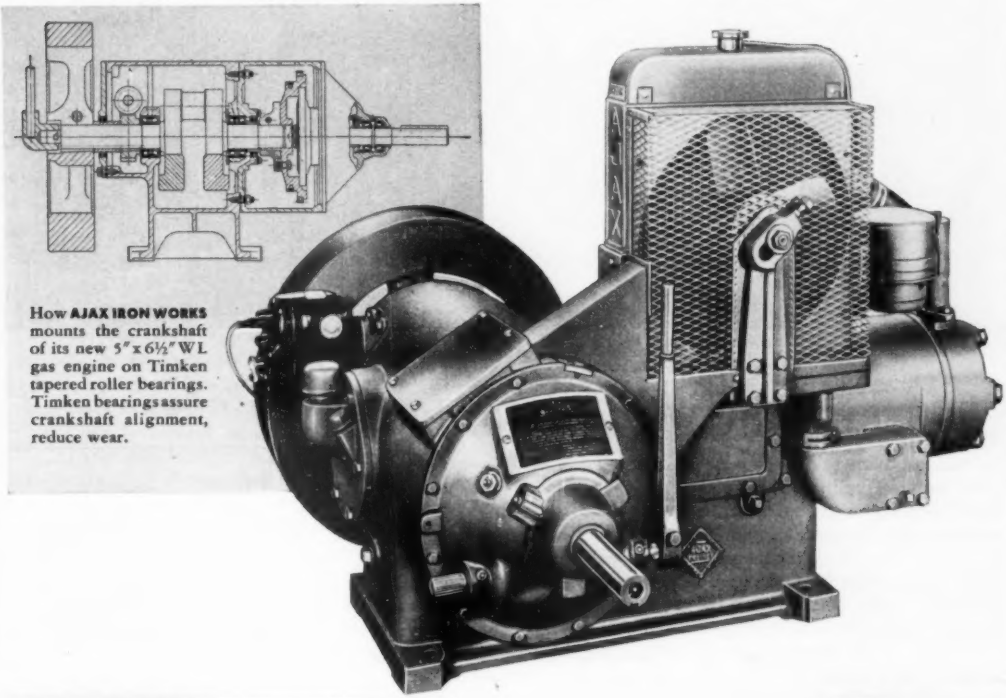
Construction features of the engine are as rugged throughout as those of its bigger brothers, the Ajax 8" and 10" stroke engines. So, of course, it has Timken® bearings on the crankshaft.

Due to their tapered construction, Timken bearings carry both radial and thrust loads in any combination. They hold the shaft in proper alignment. There's less wear on related parts—less time-out for repairs and maintenance.

Because Timken bearings hold shafts and housings concentric, closures are more effective. Dirt and water are kept out—lubricant kept in.

If you're looking for low cost operation and dependable performance, be sure to specify Timken tapered roller bearings for the machinery you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **AJAX IRON WORKS** mounts the crankshaft of its new 5" x 6½" WL gas engine on Timken tapered roller bearings. Timken bearings assure crankshaft alignment, reduce wear.

WE MAKE OUR OWN STEEL

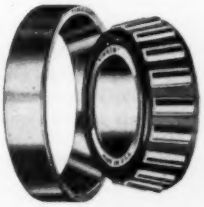
The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

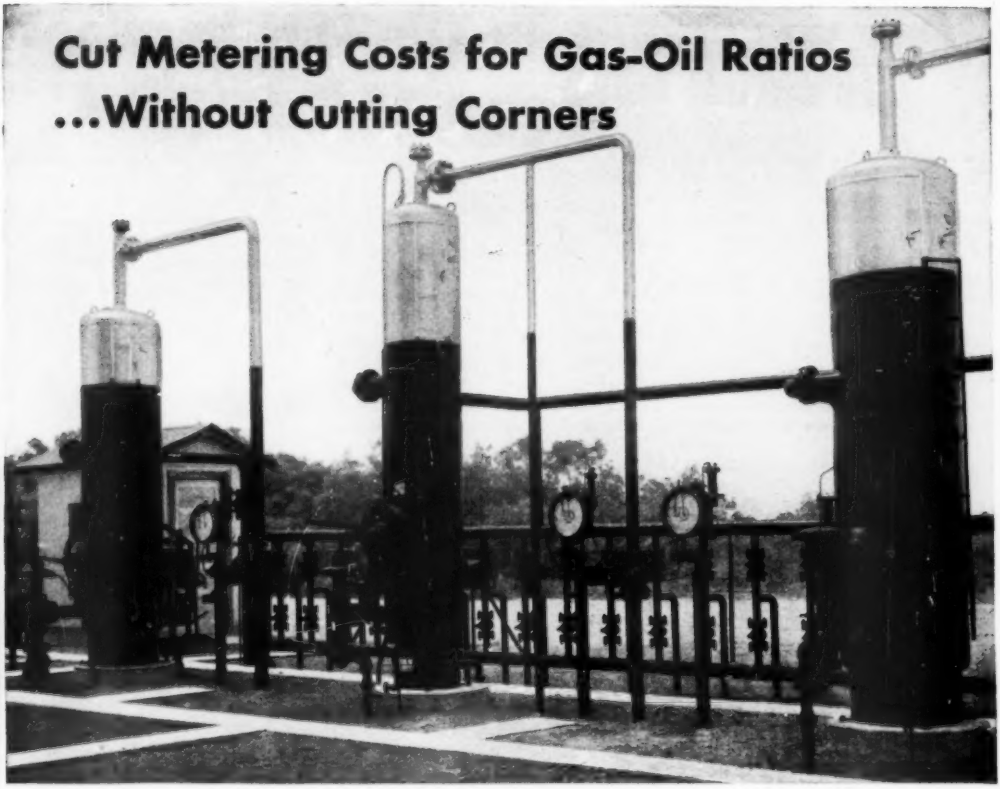
TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ◯ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊕ AND THRUST →⊕← LOADS OR ANY COMBINATION ✳

Cut Metering Costs for Gas-Oil Ratios ...Without Cutting Corners



Measuring gas from Separator Batteries at Conoco Driscol Field, Benavides, Texas with 3 Foxboro Gas Flow Meters Type 4.

HERE'S THE WAY IT'S DONE

By taking advantage of the exclusive features built into Foxboro Flow Meters, you can cut meter inspection trips and recalibration to the bone . . . *and eliminate mercury losses completely*. You won't need to coddle these meters to get accurate records.

Foxboro Flow Meters are designed with a *unique straight-line linkage* that makes factory adjustments permanent. Their sustained accuracy is outstanding. Four to six years' service without recalibration isn't uncommon! In addition, floats of Foxboro Meters are *extra large* and have *extra long* travel. This means unequalled *power* . . . giving highest accuracy at the pen. *Sure-Seal Check Valves*, submerged in mercury, positively prevent mercury losses. And for freedom from friction and freeze-ups, Foxboro Pressur-Tite Bearings have never been equalled!

These are the reasons why experienced production men prefer Foxboro Flow Meters above all others . . . why *you* can cut metering costs without jeopardizing the accuracy of your records.

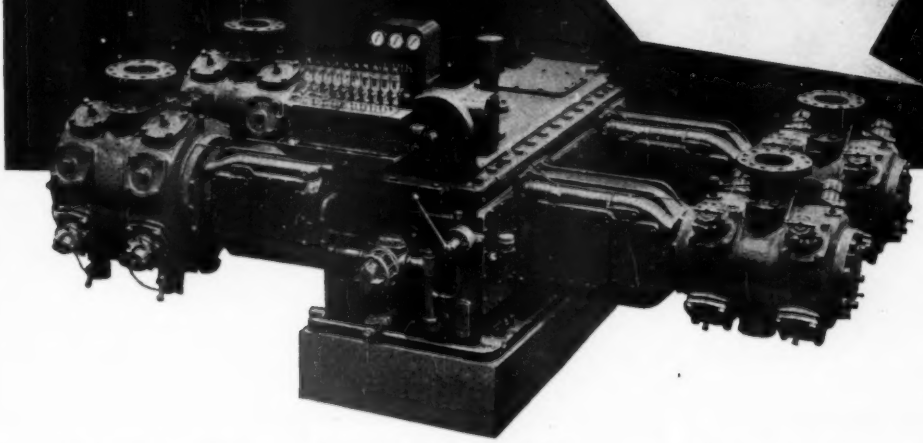
WRITE FOR Bulletin 351-2 for complete details.

The Foxboro Company, 601 Neponset Avenue, Foxboro, Mass., U.S.A.

FOXBORO
REG. U. S. PAT. OFF.

MONEY-SAVING FLOW METERS

modernize with a truly modern compressor



For your air compressor requirements in the 150-4500 bhp range, no compressor today . . . *no compressor in history* . . . can match the distinct advantages of the Clark Balanced/Opposed, Motor-Driven line.

Truly modern in every respect, it embodies only well established design principles. Thoroughly performance-proved in the toughest kinds of service, Clark Balanced/Opposed units represent the most outstanding industrial air compressor development of our times. Their features and benefits in installation, operation and maintenance are unrivaled.

Obtain *all* the facts today on the complete Clark Balanced/Opposed Compressor line available in 2, 4 and 6 cylinder sizes; 8, 14 and 17" stroke; 150-4500 bhp. Request Bulletin 118.

- *Perfect balance for vibration-free performance.*
- *Space-saving, single unit crankcase*
- *Minimum foundation.*
- *Absence of complex field alignment.*
- *More horsepower in less floorspace.*
- *Rugged, precision construction.*
- *New simplicity and accessibility.*
- *Operated with any kind of drive.*

CLARK BROS. CO., INC. • OLEAN, N. Y.
One of the Dresser Industries

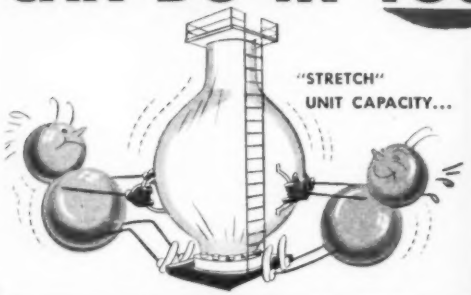
CLARK

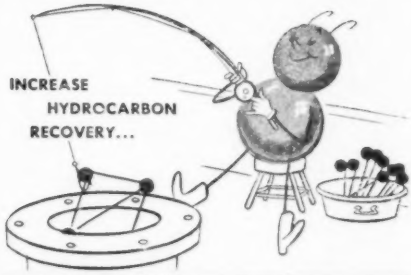
New York • Tulsa • Houston • Chicago • Boston • Washington
Los Angeles • Birmingham • Detroit • Salt Lake City • San Francisco
Buffalo • London • Paris • Varese, Italy • Ankara, Turkey
Buenos Aires • Caracas, Venezuela • Lima, Peru • Bogota, Colombia
New Delhi, India • Rio de Janeiro • Calgary, Alberta, Canada

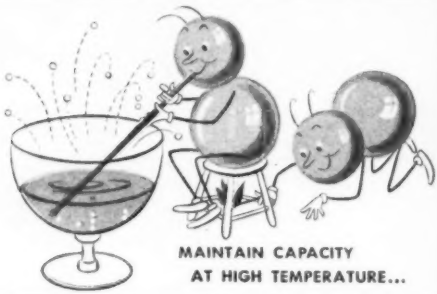
Midget Angle • Right Angle • Big Angle • Electric-Driven • Centrifugal

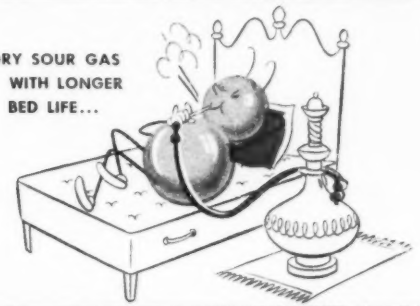
balanced/opposed COMPRESSORS

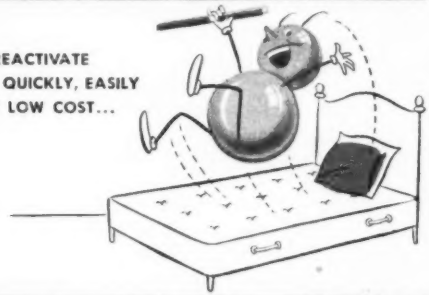
LOOK WHAT MR. SOVABEAD CAN DO IN YOUR DEHYDRATOR!











NOW... S V Sovabead *is recommended* by most leading designers and manufacturers of solid-type natural gas dehydration units... *is used* by a majority of all operators of such units... *is performing satisfactorily* in hundreds of installations throughout the world!

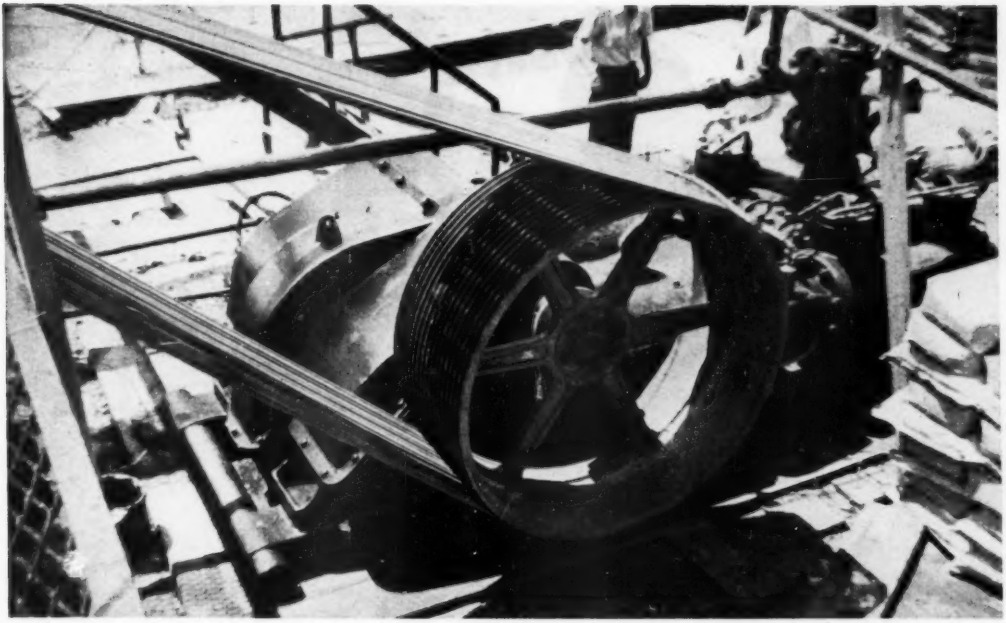
Let S V Sovabead improve *your* dehydration operations. Call your Socony-Vacuum Representative today!

SOCONY-VACUUM

Process Products

Process Products
SOCONY VACUUM

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates:
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION



Born in The Oil Fields

now the top choice of all industry and still your best V-drive buy

That's a picture of the sheave that got its start in the Southwest and is now used more often—in all industry—than any other.

What's so good about the Worthington QD?

It's easy to get on, easy to get off, yet always tight on the shaft. Two-piece construction—you first put the light-weight, split hub on the shaft and lock it; then you slip the taper-bored rim over the cone-tapered hub and use the long pull-up bolts to make a positive press fit on the shaft.

Changing sheaves is just as easy. You use the bolts as jack screws to remove the rim; the hub stays put, so there's no re-alignment problem.

It's stronger, too. Only Worthington designs each size for the load it will carry—instead of proportioning the whole line from one design. And note those I-beam spokes—lighter, but stronger.

Service is good. Local distributor stocks—a complete range— are backed by factory stocks in Los Angeles, Fort Worth, Houston, Tulsa and New Orleans. Ask for Worthington QD*.

*Trade Mark

WORTHINGTON

THE GOOD RIGHT HAND OF INDUSTRY

WORTHINGTON PUMP AND MACHINERY CORPORATION

MULTI-V-DRIVE SALES DIVISION

Buffalo, New York

POWER TRANSMISSION: sheaves, V-belts, variable speed drives

PUMPS: centrifugal, power rotary, steam

AIR COMPRESSORS: water-cooled, air-cooled

MV.1.11

ASK THE
AEROFIN MAN

For the Practical Answer to Your Heat-Exchange Problem . . .

Aerofin is sold only by manufacturers of nationally advertised fan system apparatus. List on request.

There is a competent Aerofin heat-transfer engineer near you, qualified by intensive training and long experience to find the *right* answer to your own particular heat-exchange problem.

This specialized knowledge is there, ready for you to use to your greatest advantage. Ask the Aerofin man — and be right.

AEROFIN CORPORATION

410 South Geddes St., Syracuse 1, N. Y.

Production tool for stronger pipe

One of the most important tools used to make Basalt-Kaiser line pipe meet your rigid specifications is—*water!*

Large diameter Basalt-Kaiser pipe is clamped in steel dies and hydraulically expanded by water under great pressure to assure accurate diameter, concentricity and straightness.

Because of this additional cold working, Basalt-Kaiser pipe is further strengthened to fulfill your requirements for high yield strength.

And after the dies are opened, high pressure is maintained in the pipe while measured blows are struck along the seam to test the strength of the weld.

This is only one of the exacting tests Basalt-Kaiser pipe must pass before it is delivered to you. Another good reason why experienced line men know:

It's good business to do business with

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York

They Say—

Enraptured Reader

Sir:

I wish to take time out to compliment Mr. Philip C. Ingalls on the excellent job he is doing in presenting his weekly feature reports on "Exploration and Drilling."

During the 25 years I have been in the oil business and reading the several trade journals in the industry, I have never been so well pleased by any series of articles on oil and gas.

The topics are timely and well-chosen, of course, but of equal importance is the excellence of presentation, not only in words but in the clear, informative, and neat diagrams.

I, for one, am happy to see this weekly feature in The Oil and Gas Journal, it being the first page I turn to each week. I sincerely hope for the long continuance of these articles.

Henry Rogatz, geologist,
Dallas.

Hails Water-Flood Projects

"The Kewanee Oil Co., operator directly in charge of the Mid-Burbank Unit, deserves a great deal of credit for the efficient and expedient manner in which they negotiated and completed the plan of development with agency officials and members of the Osage Tribal Council.

"The magnitude of this operation is fully recognized by members of the council and bureau and agency officials; and the members of the unit, the Kewanee, the Gulf, the Skelly, and The Texas companies are to be commended for their effort in promoting this unitized venture to develop the Mid-Burbank area by the water-flood process to obtain increased production of petroleum products so vital to our national-defense program."

Paul Pitts, chief of the Osage Indians, at inaugural ceremonies of Mid-Burbank Unit, Oklahoma.

Integration Is Necessary

"There has been much criticism of integration in the oil industry—which simply means the joining of two or more of the phases of operations from searching for oil to distributing finished oil products under one organization.

"Government antitrust suits against various oil companies have stressed the 'crime' of integration and have had the objective of dismembering the industry and making it illegal for a single company to do a complete job of producing, refining, transporting, and selling oil products.

"Actually, integration is a major reason why the industry has been able to meet the enormous demand for oil and sell us our oil at a very reasonable price. As an example, gasoline prices today are cheaper than even in terms of the purchasing power of the dollar. On top of that, the quality is better—engineering tests show that 2 gal. will do the work that 3 did 25 years ago.

"It is argued that integration undermines competition. Yet anyone can see with his own eyes that competition dominates the oil industry all the way from the biggest producer to the smallest service station. Any number of companies, each with its advertised brands, are working all-out for customer favor and trade.

"The oil industry's best endorsement is its record—yesterday and today. It has never failed us. It never will unless destructive laws weaken and dismember it.

Editorial in The Oil City, Pa., Derrick.

Lots of Steel

"Never before has this country had so much steel to use as in 1951, when about 105 million tons were produced by the steel companies of the United States. It was the first year in which the output of the world's strongest steel industry exceeded 100 million tons.

"That vast production, equal to al-

most one-third of the tonnage made in this country during the recent war years, was several times the amount needed for the defense mobilization program."

Walter S. Tower, president, American Iron and Steel Institute.

CALENDAR

January

Society of Automotive Engineers, annual meeting, Hotel Book-Cadillac, Detroit, January 14-18.

Compressed Gas Association, Inc., annual meeting, Waldorf-Astoria, New York City, January 21-22.

American Institute of Electrical Engineers, winter general meeting, Hotel Statler, New York City, January 21-25.

February

American Society for Testing Materials, Committee D-2 on petroleum products and lubricants, Shoreham Hotel, Washington, D. C., February 3-8.

Missouri Petroleum Association, annual convention and trade exhibit, Jefferson Hotel, St. Louis, February 4-6.

Instrument Society of America, New York Section, power-plant symposium, Hotel Statler, New York City, February 7-8.

American Petroleum Institute, Division of Marketing, lubrication-committee meeting, Hotel Book-Cadillac, Detroit, February 18-19.

Wisconsin Petroleum Association, twenty-sixth annual convention and equipment show, Milwaukee Auditorium, Milwaukee, February 26-27.

American Association of Petroleum Geologists, Rocky Mountain Section, annual meeting, Salt Lake City, February 28-29.

Natural Gasoline Association of America, Permian-Basin regional meeting, Lincoln Hotel, Odessa, Tex., February 29.

March

Manufacturers Standardization Society of Valve and Fittings Industry, annual meeting, Hotel Commodore, New York City, March 3-5.

American Society for Testing Materials, spring meeting, Hotel Statler, Cleveland, March 3-7.

American Petroleum Institute, Division of Production, southwestern district, Washington-Youree Hotel, Shreveport, March 5-7.

National Association of Corrosion Engineers, eighth annual conference and exhibition, Galvez Hotel, Galveston, Tex., March 10-14.

Illinois Petroleum Marketers Association, annual convention, Hotel Sherman, Chicago, March 11-13.

Texas Oil Jobbers Association, Inc., annual spring convention and refiners and suppliers exhibit, Hotel Adolphus, Dallas, March 12-13.

American Institute of Chemical Engineers, regional meeting, Atlanta, March 16-19.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 18-20.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Broadview Hotel, Wichita, Kans., March 21.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Biltmore Hotel, Los Angeles, March 23-27.

Texas Independent Producers and Royalty Owners Association, sixth annual meeting, Fort Worth, March 27-28.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 31-April 2.

Mid-West Gas Association, annual meeting, Hotel Radisson, Minneapolis, Minn., March 31-April 2.

April

American Petroleum Institute, Division of Production, eastern district, Hotel William Penn, Pittsburgh, April 2-4.

Florida-Georgia Gas Association, annual convention, Soreno Hotel, Saint Petersburg, April 3-5.

Missouri Liquefied Petroleum Gas Association, Hotel President, Kansas City, Mo., April 7-9.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 8-10.

American Institute of Electrical Engineers, District 7 meeting, Hotel Jefferson, St. Louis, April 15-17.

National Petroleum Association, semiannual meeting, Hotel Cleveland, Cleveland, April 16-18.

American Petroleum Institute, Division of Transportation, pipe-line conference, Blackstone Hotel, Fort Worth, April 21-23.

American Petroleum Institute, safety and fire-protection committees, Hotel Texas, Fort Worth, April 21-24.

American Petroleum Institute, Division of Production, Rocky Mountain district, Gladstone Hotel, Casper, Wyo., April 24-25.

Indiana Gas Association, annual meeting, French Lick Springs Hotel, French Lick, Ind., April 24-25.

Southern Gas Association, annual convention, Galveston, Tex., April 28-30.

American Oil Chemists' Society, spring meeting, Shamrock Hotel, Houston, April 28-30.

American Institute of Electrical Engineers, District 1 meeting, Binghampton, N. Y., April 30-May 2.

Natural Gasoline Association of America, annual meeting, Rice Hotel, Houston, April 30-May 3.

May

American Geophysical Union, thirty-third annual meeting, National Academy of Sciences, National Research Council, Washington, D. C., May 5-7.

American Institute of Chemical Engineers, regional meeting, French Lick, Ind., May 11-14.

American Association of Petroleum Geologists, regional meeting, Mayo Hotel, Tulsa, May 12-13.

American Gas Association, Natural Gas Department, spring meeting, Biltmore Hotel, Los Angeles, May 12-13.

American Petroleum Institute, Division of Refining, seventeenth midyear meeting, San Francisco, May 12-15.

Pennsylvania Gas Association, Wernersville, Pa., May 13-15.

American Petroleum Institute, Division of Production, Pacific Coast district, Biltmore Hotel, Los Angeles, May 15-16.

American Petroleum Institute, division of marketing, midyear meeting, Copley Plaza, Boston, May 18-19.

American Petroleum Institute, Division of Marketing, midyear meeting, Copley Plaza Hotel, Boston, May 19-20.

Gas Appliance Manufacturers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo., May 21-23.

American Gas Association, production and chemical conference, Hotel New Yorker, New York, May 26-28.

Society of Exploration Geophysicists, Gulf Coast regional meeting, Rice Hotel, Houston, May 29-30.

Seventh annual short course in gas technology, sponsored by the Southern Gas Association, Texas College of Arts and Industries, Kingsville, Tex., May 29-31.

June

Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh, June 5-6.

Canadian Gas Association, Chateau Frontenac, Quebec, June 8-12.

American Petroleum Institute, midyear standardization meeting, Brown Palace Hotel, Denver, June 9-14.

International Gas Conference, Brussels, Belgium, June 16-22.

Petroleum Equipment Suppliers Association, Mark Hopkins Hotel, San Francisco, June 22-25.

American Society for Testing Materials, annual meeting, Hotel Statler, New York, June 23-27.

American Institute of Electrical Engineers, summer general meeting, Hotel Statler, New York City, June 23-27.

September

Pacific Coast Gas Association, Ambassador Hotel, Los Angeles, September 3-5.

American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago, September 11-13.

American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City, September 28-30.

October

Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth, October 13-15.

November

American Petroleum Institute, annual meeting, Chicago, November 10-13.

December

American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland, December 7-10.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Tulsa Nomads, annual ball, Mayo Hotel, January 18.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Olde College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

TRIPLE-COILED SPIKES

GIVE

FULL-ACTION CLEANING

WITH

HALLIBURTON'S *ROTO-WALL* CLEANERS

Vertical rows of triple-coiled spikes, rotated on the casing while cement is being placed, is a far better way to remove filter-cake and get a good cement bond to the wall.

Halliburton's Roto Wall Cleaners, developed after extensive research, give you a more satisfactory cementing job and greatly minimize the need for precautionary or remedial squeeze jobs.

The Cleaners come in 5 foot sections, each section with a long row of spikes. The spikes are triple-coiled for a 360° flexing action. This flexibility gives full-action cleaning without breaking.

The sections are welded to the pipe in a staggered position and, when rotated, provide a free-flow of fluid in the annulus with no chance for bridging.

Roto Wall Cleaners permit laminated rings to form around the pipe and against the wall which helps prevent channeling. The rotating action of the cleaning spikes allows a more equal distribution of cement. They're more economical, too, for only one size cleaner base is required to fit all O.D. sizes of casing.

In addition, rotating casing – instead of working it up and down – permits the casing to be set at the desired place and helps eliminate the risk of sticking at some other point.

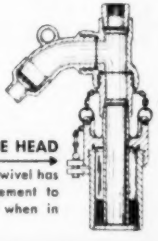
HALLIBURTON

CASING SWIVELS

the only extra equipment required with Roto Wall Cleaners

CASING SWIVEL

for use with Plug Container or Quick Change Head



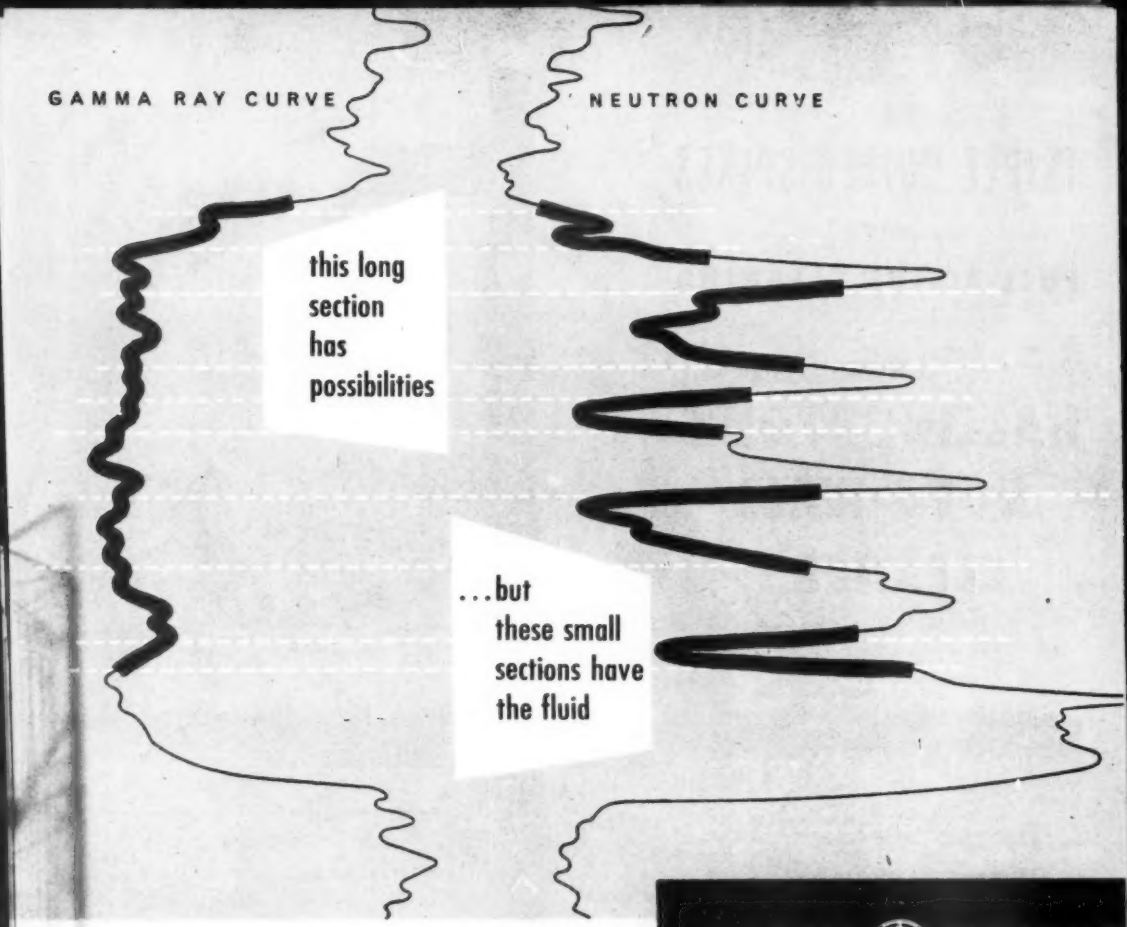
ROTO-WALL QUICK CHANGE HEAD

Each Halliburton Swivel has a locking arrangement to prevent back off when in use.

Get a safer, more satisfactory cementing job—use Halliburton's Roto Wall Cleaners. Phone your nearby Halliburton representative. *Halliburton Oil Well Cementing Company, Duncan, Oklahoma.*

HALLIBURTON

YEARS AHEAD IN CEMENTING SERVICE



You get the full story with the two curves of

LANE WELLS
Radioactivity
WELL LOGGING

Gamma Ray does a great job in locating possible production, but when you add the neutron curve, "possible" is apt to change to "probable"—or, in a known formation, to "positive production." Add the casing collar log, run at the same time, and you have the full story of your well, pinned down by immovable bench marks, to guide you in making the most profitable completion. In either cased or open hole, Lane-Wells Radioactivity Well Logging provides the most complete down-hole information possible.

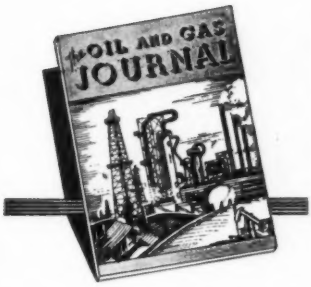
Ask Your Lane-Wells Man!

Tomorrow's Tools—Today!

AR 501

General Offices, Export Office and Plant • 5610 So. Soto St. • Los Angeles 58, Calif.

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA



Published every Thursday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle.

P. C. LAUINGER
President

S. H. ROURKE
Executive Vice President

HANSON B. PIGMAN
Circulation Manager

ADVERTISING
MITCHELL TUCKER
Vice President

New York Office
100 Fifth Avenue, Phone LOngacre 4-1750
CHARLES A. WARDLEY
Eastern Manager
ROBERT N. CAIRD, JR.
Representative

Chicago Office
105 West Madison, Phone Central 6-2537
C. R. FARMER
Manager
E. S. KLAPPENBACH
Representative

Pittsburgh Office
439 Fourth Ave., Phone Atlantic 1-4835
ALFRED M. JONES
Manager

Tulsa Office
211 S. Cheyenne, Phone 3-6391
JOHN D. REILLY
Mid-Continent Manager
J. PARKER HOLLAND
Production Manager

Houston Office
Sterling Building, Phone Charter 4626
JOHN M. SPEARS
Gulf Coast Representative

Los Angeles Office
630 S. Grand Ave., Phone Vandike 0722
DONALD O. HANSON
Manager

England Office
111 Thorley Lane, Timperley, Cheshire
HARRY BECKER
European Representative
Phone Ringway 4702

Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

Anent the Date

JUST in case you missed the several previous announcements, we hasten to assure you that this issue of the Journal is right on schedule—the new schedule, that is. It's true that the issue before this was dated December 27 and this one is dated January 7, but you haven't lost anything. We're still putting out a Big Yellow Book every week. All we did was change the publication date from Thursdays to Mondays. We also changed our closing deadlines and our printing and mailing schedule—all for the sole purpose of getting better and faster delivery of better and fresher reports on this fast-moving industry.

GOR-2

THE oil industry now has to wrestle with another kind of GOR. For years this alphabetical triplet has had a single, simple meaning: Gas-oil ratio, the measure of the gas and oil produced by a well.

Comes now the Office of Price Stabilization with a new one, officially styled General Overriding Regulation 21 but already commonly called GOR in governmentese. This is the new regulation which purports—and we use that word advisedly—to give the oil industry some basis (or at least hope) for obtaining an increase in its prices.

Not for a moment should these two GOR's be confused. They have nothing whatever in common with each other. GOR-1, the industry's old and own GOR, may be just a little bit difficult for some people to figure out and apply, but it is simplicity itself compared with GOR-2. GOR-2 says that an industry can raise its prices to the extent that its costs have gone up since prices were frozen. But does it say so just like that? Don't be silly. GOR-2 was written by government lawyers, and contains 11,231 words. It took OPS 3 months to write it, and it will take industry at least that long to figure out what it means.

That word "overriding" may need a little explaining, too. It doesn't mean what the oil industry means by the term. To an oil man, overriding means getting a percentage of the oil produced from a well or a tract of land but it remains to be seen whether or not GOR-2 will give oil men any override in the form of a percentage of the inflation that other people are producing

The word may be full of meaning, however. GOR-2 is based on the Capehart amendment to the price-control law, which is what Congress enacted to override the administration's opposition to price increases. Now if business fails to get the price increases it expects under the Capehart amendment, GOR-2 will turn out to be the administration's way of overriding the intent of Congress. And if the oil industry goes through a lot of folderol and red tape and ends up with no price increase, it will know that it has been taken for some kind of a ride, but maybe it will be an underride instead of an override.

Ace of Clubs

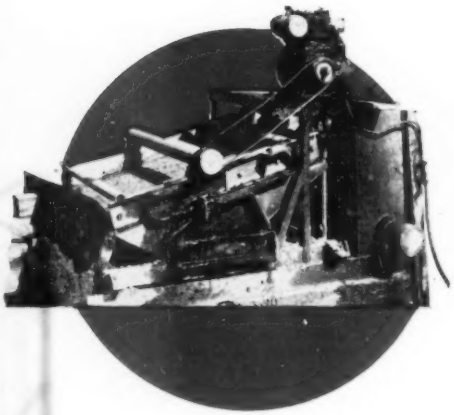
THERE are a score or more petroleum clubs in oil centers large and small throughout the country but leave it to Houston to out do all the others. The recent grand opening of the new Petroleum Club of Houston got national publicity because it cost more than $1,000,000 to build and furnish.

The newspapers described it as a "penthouse paradise," "25,000 sq. ft. of super luxury," and having a membership with a net worth of "several billion dollars." For the pleasures of "Houston's big rich," it was said, the club is furnished with objets d'art garnered from all over the world, including such whatnots as an 11-ft. bronze statute of the Chinese goddess of virtue and a porcelain stove from the palace of Emperor Franz Josef of Austria.

We know some officers of petroleum clubs in other cities who read these accounts, shook their heads, clucked their tongues, and then turned back to the prosaic task of trying to balance the budgets of their own clubs in order to maintain a comfortable, if modest, meeting and lunching place for ordinary, run-of-the-mill, working oil men. They know—but most newspaper readers don't know—that the typical oil man is not "big rich," but just an ordinary guy trying to get along on a salary or operate a small business with all the problems of inflation and taxation that beset his neighbors in any other occupation.

—Henry D. Ralph.

Special Equipment
FOR QUALITY CONTROL



● The shale shaker does an important job in keeping the drilling mud in proper condition...assuring control of the properties and qualities of mud at all times.

There's a parallel in controlling the properties of cements. This modern feeder (lower photo) continuously weighs out the exact amounts of quality raw materials...assurance that the finished cements will be uniform and possess the desired properties...performance to meet the exacting demands of oil-field service, today and tomorrow.

LONE STAR CEMENT CORPORATION

Offices: DALLAS • HOUSTON • ABILENE, TEX.
NEW ORLEANS • BIRMINGHAM • KANSAS CITY, MO.
ALBANY, N. Y. • BETHLEHEM, PA. • BOSTON • CHICAGO
INDIANAPOLIS • NEW YORK • NORFOLK • PHILADELPHIA
RICHMOND • ST. LOUIS • WASHINGTON, D. C.

the OIL AND GAS JOURNAL

January 7, 1952

VOL. 50, NO. 35

• NEWS FEATURES

• ENGINEERING-OPERATING FEATURES

• EXPLORATION-DEVELOPMENT

• REGULAR DEPARTMENTS

DO YOU KNOW HOW "Metal Petals" BRING YOU SUCCESSFUL CEMENTING RESULTS?

In any cementing where a lower zone must be protected from contamination by the cement slurry (as well as from sloughings or cavings) the Baker METAL PETAL Basket will be found both safe and successful.

The unit is constructed of a number of individual "petals" made of flexible sheet metal. These petals are mounted on reinforcing spring steel ribs, which in turn are mounted on a ring to form the Basket.

When running in the hole, the upward pressure of the fluid tends to close the "petals" thus providing fluid passageway between the Basket and the walls of the hole, without distortion of the Basket. As soon as the casing comes to rest, upward pressure by the fluid is relieved and the petals expand to contact the walls of the hole. Any tendency of fluid to move downward then presses the flexible petals more firmly against the entire circumference of the hole. Solids strained from the fluid tend to build a bridge inside the Basket which is thus converted into a one-way packer of great strength and effectiveness.

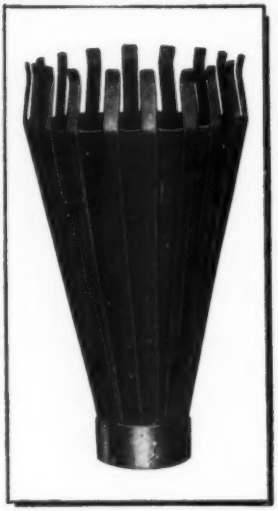
SIMPLE, EFFECTIVE ACTION

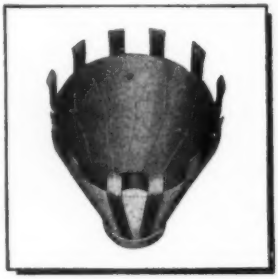
The "Metal Petals" not only expand to contact the entire circumference of large diameter holes, but also pack-off in holes of irregular shape; and the independent action of the individually mounted overlapping petals permits successful use of the Basket in casing programs with minimum clearances.

All-metal construction and design provide ample strength; lessen the possibility of splitting or otherwise damaging the Basket while it is being run in; and the metals are unaffected by usual acids employed for various purposes.

MOUNTINGS TO MEET ALL NEEDS

Baker Metal Petal Baskets are furnished mounted on plain or perforated nipples; with or without different types of Baker Whirler Float Collars; for a wide range of cementing applications. When conditions permit, it is recommended that Baker Metal Petal Baskets be "slidably" mounted to allow rotation, spudding, or reciprocation of the casing without distorting or damaging the Basket. Maximum efficiency of Baskets is assured when a Baker Model "G" Casing Centralizer is used immediately below the Basket assembly. For details see the Baker (or Composite) Catalog; or ask any Baker representative for specific recommendations.

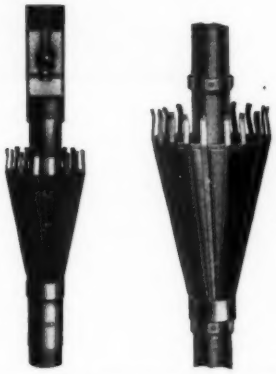




TOP, Baker Metal Petal Basket (Product No. 340) ready for assembly into any required cementing hook-up. The strong, spring steel ribs, each with a "metal petal" attached, expand against the wall of the hole to form a safe "one-way" packer which prevents downward movement of the cement slurry.

LOWER VIEW illustrates the overlapping "petals" (each mounted on its individual spring steel rib) thus providing flexibility and freedom of expansion to pack-off around the circumference of large-diameter holes, or holes of irregular contours. A Baker Model "G" Casing Centralizer mounted just below the Basket is recommended.

LEFT, a popular hook-up consisting of a Baker Metal Petal Basket mounted on nipple, with a Baker Cement Whirler Float Collar with Solid Baffle (Product No. 305) which causes the cement slurry to pass through the baffled, side-whirler ports.



RIGHT- Where the casing is to be rotated or reciprocated while cementing, the Metal Petal Basket is "slidably" mounted between two Stop Rings. This permits free rotation, and ample vertical movement of the casing, without distorting or damaging the Basket.

HERE'S AN EXAMPLE OF STRENGTH

The Baker Metal Petal Basket holds a record for keeping cement ABOVE and OUT OF a "zone" possessing *lower formation pressure* and *higher permeability* than is likely to be encountered in any oil well. The "zone" was an *open* coal mine stope (lateral) through which a 16-inch hole had been drilled. A Baker Metal Petal Basket, mounted on 10¾" casing (used as the surface string) successfully supported a 640-foot column of cement slurry above the stope, without breakdown or leakage. This example not only demonstrates the bridging ability of the Basket assembly, but also is evidence of the tremendous structural strength which it possesses.

BAKER METAL PETAL BASKET PRODUCT NO. 340

BAKER OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

Unfreeze Oil Prices Now

Now is the time for the oil industry to make a determined effort to get a general increase in the price of crude and petroleum products. It may not be the time to get as large an increase as the industry feels it should have, but it is the time to break the ice which has held oil prices frozen rigidly for more than a year.

The Office of Price Stabilization appears at the moment to be more inclined than was its World War II predecessor to recognize the principle of flexibility of the price structure and to allow increases in ceiling prices commensurate with higher costs. Its new regulation under the so-called Capehart amendment opens the door to increases in oil prices to cover the rise in costs between June 1950 and July 1951.

Many in the oil industry believe that oil prices should go higher than permitted by the Capehart formula. There has been no general increase in oil prices since November 1947, though costs have gone up steadily. When OPS moved in with the Korean war it froze oil prices at what proved to be an inequitably low base.

A representative committee is now engaged in a monumental study of the cost of replacing the oil that is now being produced and sold. This information is essential if the industry has to justify a price scale which will permit it to continue to find new reserves. Such an increase might be double that permitted by the Capehart formula, but there may be a long delay in getting the replacement-cost figure compiled and accepted.

It will be much simpler to show how actual operating costs have gone up since the price freeze, and OPS now recognizes this as the basis for increased prices for oil and all other commodities. Oil should take advantage of this while flexible price control is still part of official policy.

Likewise, encouragement should be given to price applications by producers of special types of crude or in certain areas, such as Penn Grade crude, in order to clinch the principle that oil prices should be flexible and related to costs. And, of course, prices of refined products must likewise move upward with costs, including the cost of crude oil.

During World War II, oil prices were frozen rigidly by an administration which refused to recognize flexibility or production costs. The ceiling price of crude became a political football, and the longer an increase was delayed, the harder the administration opposed it. There is danger that the price of oil will again become a political issue if the freeze is not cracked soon.

Now the Capehart formula offers oil some unfreezing of its rigid price schedule, some recognition of advancing costs. This procedure should be tested at once, without abandoning the longer-range program of getting recognition of replacement costs. The sooner the price ice is broken, the less the danger that the freeze will be deepened by unbending political opposition to any relief whatever.

THIS WEEK

SETTING NEW RECORDS.—Production of liquefied petroleum gas reached an all-time high during 1951 of 4.1 billion gallons, a jump of nearly 26 per cent over 1950's previous high. One of the new plants which came on stream during the year to contribute to the new peak was the Elk City, Okla., gasoline plant operated by Shell Oil Co. on behalf of eight other oil-company owners. Shown here are the distillation columns at the Elk City plant and the lines, foreground, which move the products to storage tanks. A year-end review of the accomplishments of the L.P.G. industry may be found in this issue on page 46.

L.P.G.—Spot shortages of L.P.G. expected as demand keeps soaring. . . . Output during 1951 reached 4.1 billion gallons, an increase of 25.9 per cent over 1950. . . . ¶Combined use of L.P.G. for domestic purposes and as motor fuel during 1951 estimated at 2,868,000,000 gal., a jump of 32.5 per cent over 1950, more than total industry sales in 1949. . . .

INTERNATIONAL.—Iraq Petroleum Co. rushing completion of big-inch crude line from Kirkuk field to Banias. . . . Rapid finish essential in order to help make up deficit to European refineries caused by shutdown in Iran. . . . ¶Representatives of International Bank of Reconstruction and Development now in Iran for on-the-spot investigation aimed at resumption of oil operations with bank assistance. . . . ¶Socony sets price of Basra Petroleum's Zubair field crude at $1.67 per barrel f.o.b. terminal at Foa, Iraq. . . . ¶Stratigraphic traps may provide new Middle East reserves, Baker tells geological group. . . .

ACTIVITY.—Crude production for the week ended December 29 averaged 6,134,600 bbl. daily, down 125 bbl. daily. . . . ¶Well completions for the week totaled 860, up 13 wells from the previous week and 46 from the same week last year. . . . ¶Wildcat completions decreased 15 wells for the week to 194. . . . ¶A total of 2,944 rotary rigs were operating in the United States on December 24, a gain of 578 over the same date last year.

TRENDS.—Gasoline stocks east of California on December 22 were 6,538,000 bbl. or 6.7 per cent greater than last year. . . . ¶Demand for refinery gasoline is running about 13 per cent more than last year. . . . ¶Increases in gasoline stocks in District 2 account for 63 per cent of total gain. . . .

STEEL.—Representatives of 29 oil and gas associations to meet with PAD in Washington next week to discuss distribution of oil-country tubular goods. . . . ¶NPA issues further controls on casing, tubing, drill pipe, prohibiting deliveries by distributors except on authorized controlled-materials orders. . . .

WASHINGTON.—Congress returns to Capitol Hill this week, but no action is expected on pending oil or natural-gas legislation for remainder of this term. . . . Only major tax, expenditures bills slated for consideration. . . . ¶Oil men visiting Washington on business no longer have to wander around from office to office to find help; several agencies eager to help them solve problems. . . .

PRODUCTION.—Operating committee of unitized oil field has final word in determining how its wells shall be operated, Circuit Court of Appeals rules in Denver. . . . West Edmond Hunton Lime Unit entitled to injunction preventing Stanolind from interfering, court holds. . . . ¶Industry casting anxious eyes toward Bismarck, as North Dakota prepares for first regulatory hearing, involving Amerada well-spacing case. . . . ¶Colorado conservation group orders gas-output limitations in Rangely field, gives operators until February 15 to decide on gas-injection, conservation plan. . . .

INDUSTRY.—Ready-made case charging that United States oil industry is being squeezed out of both domestic, foreign market by combination of five groups of international oil companies laid before House and Senate committees on small business by Elmer Patman, Austin oil attorney. . . . ¶Patman's charges that the firms are involved in international cartel denied by representatives of companies concerned. . . . ¶I.P.A.A. seeking crude price increase to offset accumulated costs. . . . ¶PAD sees no major increase in imports of Middle East crude to United States, at least in immediate future. . . .

Congress Returns

Only major bills slated for consideration during brief session; no action expected on oil or gas legislation

Bertram F. Linz

WASHINGTON. — Congress returns to Washington this week for its second and final session, determined to wind up its work by July to make way for what undoubtedly will be the bitterest presidential campaign in 20 years.

Because of that campaign, the major interest of the session is expected to center about the investigations of government officials and scandals reminiscent of the Harding regime and Teapot Dome.

Last session, congressional committees probed charges of influence and pressure brought to bear to secure Reconstruction Finance Corp. loans and more recently the conduct of Internal Revenue officials. The first led to reorganization of the RFC and the last has resulted in the discharge or resignation of a number of Internal Revenue Bureau officials and the dismissal by the President of an assistant attorney general.

Tubular-goods inquiry. — During the coming months, the investigations may go further into the Internal Revenue Bureau and branch off into probes of the Alien Property Office and the conduct of the foreign-aid program. Already firmly scheduled, also, are probes by the House small-business committee into the distribution of tubular goods in the oil and gas industry and by the Senate investigating committee into the purchase and subsequent highly profitable resale of surplus government tankers by a syndicate which included a former congressman and several former government officials.

Within a few days President Truman will inform Congress of legislation he wants, but there is little indication that he will get much of what he asks. He is expected to recommend further increases in taxes or, as an alternative, the closing of loopholes, including the depletion allowance, through which he says the Government is losing large tax revenues, and probably will make another appeal for some phases of his social program, in neither case evoking much enthusiasm in Congress.

Limited session.—Because of the limited session only legislation of major importance will be considered. This will include, of course, the appropriation bills, expected to set another new high record for government spending, and such measures as continuation of the Defense Production Act, on which the mobilization program is based, and foreign aid.

The Defense Production Act is certain to receive an extension, but there will be considerable controversy over the policies followed by the Office of Price Stabilization, in particular, and to lesser degree by the National Production Authority.

The administration is seeking to make political capital out of the way prices have remained fairly stable during the past year, but actually that situation has been due largely to the operation of the law of supply and demand, as demonstrated in the case of a number of major raw materials which for months have been selling at prices well below their ceilings. There will be some successful demand for total elimination of price controls and an effort to ease the rigid control structure the OPS has built.

Oil, gas bills.—So far as the oil and gas industry is concerned, there is a considerable amount of unfinished business on the books but most of it will still be that way when the Eighty-second Congress adjourns next summer.

The major item on the oil calendar is the legislation clearing up the status of the tidelands. Recent efforts of Interior Secretary Oscar L. Chapman to find a chink in existing laws through which he might assume management of the offshore oil reserves in the Gulf of Mexico may spur proponents of state ownership to press for a showdown which has been long deferred. The House approved such a bill last year by a 265-109 vote, sufficient to override a veto, but the Senate is more evenly split and while the bill probably could be passed there is some question whether a veto could be voted down.

Another measure of widespread importance would write into law the Supreme Court decision in the Standard Oil Co. (Ind.) case brought by the Federal Trade Commission, affirming the right of a seller to cut his prices to meet competition.

Two bills affecting the leasing of public lands are pending in House committees. One would require competitive bidding on oil and gas leases on the Government's acquired lands where a competitive interest in leasing is evident. The other would eliminate the present waiver of second and third-year rentals on lands not within any known geological structure of an oil or gas field.

Tankers.—The tanker situation may come up for discussion in connection with an expected investigation of our merchant marine and the need for a long-range ship-construction program. A lot of ships are being built, but only a fraction of 1 per cent of them are being built in the United States (only 17 tankers out of 521).

Also in the hands of committees are several bills aiming at establishment of commercial production of synthetic liquid fuels and a number of measures dealing with various aspects of natural-gas transportation and storage.

In addition to the major investigations which Congress will make, it is expected that committee studies will be launched of the oil and gas situation. Members of the House interstate commerce committee returned in December from a month-long tour of Latin America where they surveyed the oil industries of several countries. Some undoubtedly will have ideas for legislation.

Two proposals for probes are hanging over from last session, one into the concessions of United States oil companies abroad and the other into New England's fuel supplies. If the northeastern states get through the winter without fuel difficulties the latter probably will be shelved, however.

Gas' Demand Forecast Sought

WASHINGTON.—Two hundred of the nation's largest gas companies have been asked by the Petroleum Administration for Defense to forecast the future demand for gas under the current mobilization situation.

Questionnaires have been sent to the companies, which account for 91 per cent of the gas consumed in the United States, asking for estimates of the steel that will be needed for the gathering, transmission, distribution, and storage of gas if the predicted demand is to be met.

There are some 1,250 gas companies in the United States, but the 200 canvassed are expected to provide information from which the total demands of the industry can be estimated with reasonable accuracy.

Announcing the sending out of the questionnaires, Deputy Administrator Bruce K. Brown explained the information is sought so that the appropriate representations can be made to the Defense Production Administration for the allocation of steel for the gas industry.

Because of the pressure of the defense program, PAD so far has had to limit its consideration of gas expansions to pipe lines to be completed this year. It is planned now to establish programs running through 1955.

Help for Oil Men

Here are the agencies, officials to see in Washington for fast answers to problems caused by defense controls

Bertram F. Linz

WASHINGTON.—It used to be that when an oil man came to Washington with a problem he wandered around from office to office looking for someone who could help him and usually wound up in a hotel room, footsore, weary, and disgruntled.

Today an oil man can come to the national capital, readily find an official who will know what he is talking about, and can advise, and get back to his own job in a minimum of time.

Here's why.—Two factors have contributed to this modernization of bureaucracy. One is the gradual realization by government officials that industrial controls raise a steady stream of problems which must be resolved quickly if the defense program is to go ahead under full steam. Probably more important is that a majority of officials in the defense agencies were drawn from industry and know from their experience as businessmen how frustrating Washington can be.

While most government officials are willing to see any man who drops in on them unannounced, if time permits, they naturally prefer that a visitor first telephone or write and make an appointment so they can schedule an interview as free as possible from interruptions.

Staff meetings, intraagency discussions, interagency consultations, and other types of conferences demand officials' attendance and take up a great deal of time. Therefore a man who calls on them casually is likely to have to sit around, maybe for hours, before they can see him. Then too, there is always the possibility that an official who must be seen will be out of the city on official or other business.

Defense organization.—The mobilization organization which today is directing the nation's economy is a vast and complex structure, not only including the emergency agencies but cutting across practically the entire government establishment.

At the top is the Office of Defense Mobilization, the policy-making agency for the whole rearmament effort. Next come the Economic Stabilization Agency, dealing with salaries, wages, and prices, and the Defense Production Administration, developing the programs administered by the National Production Authority.

NPA controls the use of scarce materials and makes allocations for various uses and industries. In the case of certain important industries, the development of programs and the allotment of materials is handled by separate agencies set up for the purpose, subject to over-all control by DPA and NPA.

Special agencies.—These special agencies include the Petroleum Administration for Defense, Defense Solid Fuels Administration, Defense Electric Power Administration, Defense Minerals Exploration Administration, and Defense Fisheries Administration, all under the Secretary of the Interior; Defense Transport Administration, under the Interstate Commerce Commission; Defense Materials Procurement Agency, under the General Services Administrator; and the Civil Defense Administration.

A number of government agencies also serve as "claimants" for materials distributed by NPA for various purposes, among them the Defense Department, Atomic Energy Commission, Federal Security Administration, General Services Administration, Veterans Administration, Department of Agriculture, Maritime Administration, Civil Aeronautics Administration, and Bureau of Public Roads of the Department of Commerce.

Other agencies have certain powers with respect to exports, such as the Office of International Trade and the Economics Cooperation Administration; in the field of manpower, through the Department of Labor; or as regards finance and credit, such as the Federal Reserve Board, Recon-

Who's Who in Oil in the Nation's Capital

PETROLEUM ADMINISTRATION FOR DEFENSE

Eighteenth and C. Streets, Phone RE 1820

Bruce K. Brown, deputy administrator, Room 6512, Extension 3831.
A. P. Frame, domestic operations, Rm. 6516, Ext. 3891.
C. S. Snodgrass, foreign operations, Rm. 6520, Ext. 3165, 3184.
C. P. Rather, gas transmission and distribution, Rm. 6517, Ext. 5321.

Production Division

R. L. Foree, chief, Rm. 2557, Ext. 3615, 4934, and 4935.
F. O. Brett, drilling production, and materials, Colonial Village, Arlington, Va., Ext. 2230, 3032.
E. G. Bemis, exploration and reserves, Colonial Village, Arlington, Va., Ext. 2882, 4266.

Gas Production, Processing Division

R. P. Walsh, director, Rm. 6445, Ext. 4847, 4794.
W. E. Caine, planning, Rm. 5020, Ext. 5360, 2521.
A. D. Greene, operations, Rm. 5245, Ext. 5325.
V. F. Bowyer, transmission, Rm. 5241, Ext. 2110.
S. A. Chadwell, control, Rm. 5241, Ext. 2110.
G. F. Stinnett, distribution, Rm. 5241, Ext. 2110.
L. C. Sonnen, facilities, Rm. 6071, 3946.

Refining Division

C. E. Davis, director, Rm. 6459, Ext. 5343.
W. C. Huffman, assistant director, Rm. 6457, Ext. 2312.
R. B. Wilson, projects branch, Rm. 6453, Ext. 2986.
F. R. Grant, products-supply branch, Rm. 6447, Ext. 2533.

Supply and Transportation Division

G. A. Wilson, director, Rm. 5251, Ext. 2797.

Program Division

C. L. Burrill, director, Rm. 6458, Ext. 2728, 3094.

Marketing Division

L. W. Lee, director, Rm. 6526, Ext. 4642.

Manpower Division

S. E. Hill, director, Rm. 6524, Ext. 4085.

Facility-Security Division

W. R. Boyd, III, director, Rm. 2448, Ext. 2747, 3692.

Materials Division

R. M. Morrison, director, Rm. 2542, Ext. 5397.
H. R. Hansen, program coordination, administration, Rm. 2540, Ext. 3666, 3380.
H. R. Lamberth, material procurement, Rm. 2540, Ext. 3380, 3666.
G. W. Knight, materials for foreign operations, Rm. 2546, Ext. 3971.
W. E. Tyler, construction projects, Rm. 2023, Ext. 3426.
W. R. Gottshall, steel, copper, aluminum, tin, lead, and zinc, Rm. 2559, Ext. 3097.
R. P. Wood, industrial equipment, Rm. 2444, Ext. 2366, 2278.
H. J. Herzog, specialty equipment, Rm. 2554, Ext. 2967.
T. H. Herman, Jr., chemicals, containers, packaging, Rm. 2556, Ext. 5335.

J. P. DeSale, materials for equipment manufacturers, Rm. 1070, Ext. 5353.
H. R. Walters, pipe-line supply, Rm. 2025, Ext. 2333.
C. C. Watson, Jr., foreign materials, Rm. 2546, Ext. 3963, 3971.
L. V. Shaughnessy, marketing, Rm. 2446, Ext. 2693.
O. E. McClatchey, transportation, Rm. 1070, Ext. 5351.

Foreign Operations

W. H. Farrand, production, Rm. 5256, Ext. 682, 3234.
J. J. Brazil, exploration and reserves, Rm. 5254, Ext. 3346, 3679.
G. T. Ballou, refining, Rm. 5258, Ext. 770, 3088.
J. K. Kelsey, refining facilities, Rm. 5260, Ext. 2034.
R. A. Keppel, operations, Rm. 5260, Ext. 3683.
J. A. Walstrom, supply and transportation, Rm. 5252, Ext. 2031, 2037.
D. H. West, distribution, Rm. 5250, Ext. 723.
R. W. Sanders, transportation, Rm. 5260, Ext. 3683.

ECONOMIC SECURITY ADMINISTRATION

Salary inquiries.—Industry-relations department, Rm. 1077, Tempo R. (Fourth Street and Independence Avenue, S.W.).
Wage inquiries.—Industry-relations department, Rm. 4315, Federal Security Building (Fourth Street and Independence Avenue, S.W.).

OFFICE OF PRICE STABILIZATION

Crude, product price inquiries.—L. T. Cramer, petroleum branch, Rm. 2323, Tempo S. (Sixth Street and Jefferson Drive, S.W.), Phone ST 4200, Ext. 8251.
Equipment price inquiries.—Leslie Carson, machinery division, Rm. 2526, Ext. 6534.

NATIONAL PETROLEUM ADMINISTRATION

Inquiries not involving PAD.—Contact Reception Center, second floor, General Accounting Office Building, Fifth and G. Streets, N.W., Phone ST 5200, Ext. 6112.

OFFICE OF INTERNATIONAL TRADE

Export licensing inquiries.—L. M. Carson, petroleum director, Department of Commerce Building, Fourteenth Street and Constitution Avenue, N.W., Rm. 3877, Phone ST 9200, Branch 3104.

struction Finance Corp., and Housing and Home Finance Agency. The legal aspects of the defense program are policed by the Department of Justice and its financing is cleared through the Bureau of the Budget.

The Smaller Defense Plants Administration, recently set up to look out for the interests of small business, brings the number of agencies and departments involved in the defense program to a round 30, not including such organizations as the National Security Resources Board, Research and Development Board, etc., which have defense responsibilities but of a more permanent character.

Who to see.—While the number of agencies having a voice in the mobilization effort is large, the great majority of problems which bring oil and gas men to Washington will come under the jurisdiction of three or four government offices.

For by far the greatest number of questions they are most likely to find the Petroleum Administration for Defense their best port of call. But if they have price problems they will have to go to the Office of Price Stabilization. Wage questions must be taken to the Economic Stabilization Agency, difficulties with materials must go to the National Production Authority, if PAD doesn't have jurisdiction; while export-license difficulties call for action by the Office of International Trade.

No agency is more alert to the difficulties which government controls raise for industry than PAD, nor more anxious to help in their solution. PAD is located in the Interior Department building, 18th and C Streets, Northwest; Telephone REpublic 1820.

While Interior Secretary Oscar L. Chapman is petroleum administrator for defense, the operating head of PAD is Deputy Administrator Bruce K. Brown. Its several divisions are grouped under three assistant deputy administrators—A. P. Frame, for domestic petroleum operations; C. Stribling Snodgrass for foreign petroleum operations; and Charles P. Rather, for gas transmission and distribution.

Operators with production problems should take them to the production division, headed by Robert L. Foree. Drilling, production, and materials are under Floyd O. Brett, assistant chief; and exploration and reserves are under Edwin G. Bemis, assistant chief.

New Price Plan

Crude markup to offset accumulated costs sought

WASHINGTON.—A new approach to the problem of bringing crude-oil prices into line with other commodities will be submitted to price-stabilization officials within the next few days by the Independent Petroleum Association of America.

Exploratory discussions held late last year on the possibility of raising crude-price ceilings bogged down over the question of whether applications for adjustment should be on an individual or all-industry basis. I.P.A.A. spokesmen contend, and the Office of Price Stabilization agrees, that it is impractical to handle the matter on an individual basis, but price officials have not yet laid down any policy which would make broader action possible.

The I.P.A.A. is making a long-range cost study, but some time will be required for its completion, and producers are anxious for quick action.

Cost adjustment. — Accordingly, it is now planned to lay a proposal before OPS in which it will be assumed that the prices prevailing a year ago when ceilings were imposed were fair prices as of that time, having been established during a period of full supply and an open competitive market. Upward adjustment will be requested to take care of whatever additional cost accrued up to last July 26, as provided for by the Capehart amendment to the Defense Production Act, as a preliminary action pending more comprehensive study of the whole price matter.

At the same time, I.P.A.A. will urge that pricing for the crude industry be handled on at least a segment basis. On this basis, an adjustment for one field of specified gravity would carry with it the other fields of the same gravity, with such modifications as might be necessary to take care of differentials in transportation costs.

Sulfur Use Cut

WASHINGTON. — An across-the-board cut of 10 per cent in the consumption of sulfur has been put into effect by the National Production Authority.

Officials believe, however, that there will be adequate supplies of acid for the 1952 petroleum-production program.

The new order provides for the issuance of directives to sulfur suppliers to make deliveries where necessary for the production of aviation gasoline, catalysts, sulphonates for additives, and other products.

It also provides an exemption from its restrictions for sulfuric acid produced by refiners by means of facilities installed since June 24, 1950. This is in line with previous actions by NPA designed to encourage refiners to install recovery equipment by permitting them to use the recovered acid.

The oil industry is producing considerably more sulfur than it uses in its own operations and last year engaged in an expansion program designed to add 190,000 tons a year to the nation's supply. The industry accounts for some 12 per cent of the total domestic consumption and in 1951 is estimated to have consumed some 638,000 long tons of sulfur in the form of fresh acid.

No Added Imports

Increase of Middle East crude to U. S not expected

WASHINGTON.—The need for diverting foreign crude from United States to European refineries to offset the effects of the Iranian shutdown is not expected to be imperative after this quarter, but Petroleum Administration for Defense officials said this week they do not expect any substantial increase in imports of Middle East oil in the near future.

They explained that economic conditions indicated that the refineries which had cut back on their imports of foreign oil last year would continue to process the additional quantities of domestic crude which they substituted for Middle East supplies.

While there was some cutback in actual importations as a result of the loss of Iranian oil, most of the "diversion" of Middle East crude was the shifting to Europe of oil which the companies had intended to bring in in the future. The effect of this policy was evidenced in the flattening out of the import curve, which at the time of the Iranian shutdown was rising.

No switch planned.—There has been no indication on the part of the companies that they proposed in the near future to switch the oil which now is going to Europe, and the present import situation is expected to continue for many months at least.

Even if and when Iranian oil again becomes available, it will find its place in the world stream only slowly. It is estimated it would be about 6 months before tankers could be provided in adequate tonnage and Iranian production could be built up to 75 per cent of its former level and probably 9 months before it would be on a 100 per cent basis.

Would cut output.—To bring Iran back into the picture it would be necessary for some of the other Middle East producers to cut back their output, which it is reported they would be glad to do since they would not have been producing now at present rates had it not been for the crisis which arose last summer.

But even if the Iranian controversy were to be settled tomorrow it would be many months before the world oil flow was back in its normal channels.

Tubular-Goods Talks Set

WASHINGTON. — Representatives of 29 oil and gas associations have been invited by the Petroleum Administration for Defense to meet in Washington January 10 for another discussion of the distribution of oil-country tubular goods.

PAD officials explained that the meeting is not the result of any protests against or criticisms of the pres-

WATCHING WASHINGTON

Bertram F. Linz

Marshall Plan, ECA Pass On

The Marshall plan and the Economic Cooperation Administration passed into history at the close of 1951 and all forms of foreign aid now are in the hands of the new Mutual Security Agency.

During the life of the Marshall plan, which ended 6 months before its scheduled date of next June 30, ECA distributed $12,000,000,000 in grants and loans to the European nations, of which slightly more than $1,250,000,000 was for petroleum and products.

That the program was a successful experiment to bring a prostrate Europe back to productivity is shown by the quadrupling of its refining industry in a period of 45 months. Based on 11 major projects and a number of smaller ones Europe's refined-products output was boosted from an average of 12,000,000 tons annually in prewar years to 46,800,000 tons in 1950-51.

The expansion of European refining and its production of iron and steel and other commodities not only helped Europe but cushioned the impact of the Korean war on the American economy. When the Iranian oil industry closed down last year, European refineries took up much of the burden that otherwise would have been thrust upon our own industry.

The Mutual Security Agency will continue the program for providing technical assistance to European industry but will emphasize the strengthening militarily of the North Atlantic Treaty Organization countries.

Gas Opposition Wins Point

Opposition of coal, labor, and railroad interests to the construction of new natural-gas pipe lines has been given increased weight by a court decision holding that they have a right to appeal from orders of the Federal Power Commission.

Although it affirmed an FPC order authorizing construction of a pipe line to serve an atomic-energy plant, the United States Court of Appeals ruled that a coal trade association and coal and railroad unions had a right to contest a commission order. The court held that the review provisions of the Natural Gas Act authorize appeals to prevent unlawful official action in order to vindicate the public interest even though no personal substantive interest of the persons appealing would be invaded.

The extension of natural-gas service into new markets has been vigorously opposed before the commission by the coal, labor, and railroad groups on the ground it would invade markets they have historically enjoyed and result in unemployment in the coal and railroad industries.

Planning, Procurement Hit

Dissatisfaction with the Defense Department's planning and procurement policies which has been manifested in every report issued during the past year by Sen. Lyndon Johnson's investigating committee and other congressional groups has spread to the President's Cabinet, of which the Secretary of Defense is a member.

Going far beyond his responsibility of watching the defense program to insure it is not used to eliminate competition or create monopoly, Atty. Gen. J. Howard McGrath, also a member of the Cabinet, warns that inept military planning threatens to wreck the civilian economy.

The same mistakes that were made in World Wars I and II are being repeated in the same quarters, McGrath implied.

Even after 18 months of actual fighting, McGrath complained, there is no adequate machinery to mesh military and civilian production into a single smooth-working unit.

Bitter Little Feud Raging

A rather bitter little feud is raging in the Federal Power Commission over whether the proceedings in natural-gas rate cases should be short-cut.

Acting Chairman Thomas Buchanan has taken vigorous exception to the action of the other three members of the committee in refusing to omit the intermediate-decision procedure in one of the rate cases that have come up.

The object of such waiver, Buchanan holds, is to speed up the handling of cases. Only in this way, he contends, is it possible for the commission to act on all such cases within the 5 months provided by law for the suspension of new rate schedules.

The other members point out, reasonably enough, that the case of which Buchanan complains is the first of all the rate proceedings before the FPC in which a motion has been made to waive the intermediate-decision procedure.

ent allocation procedure but is in line with a policy determined after a similar meeting last September to have the industry in periodically to review the situation.

It is hoped that out of the talks this week more suggestions for the improvement of the distribution procedures will develop.

The September conference developed a number of suggestions for refining the criteria used in granting priorities assistance for the purchase of oil-country tubular goods which were incorporated in PAD Standard 2, issued a week later.

New Defense Orders

WASHINGTON.—The following orders have been issued by the National Production Authority:

Amendment to NPA Reg. 1, December 14: Lifting inventory restrictions from 5 materials now in better supply and tightening restrictions on 19 other materials.

Schedule C to M-80, December 17: Restricting the end uses of nickel.

Amendment to M-22, December 17: Limiting deliveries of aluminum scrap.

Amendment to M-16, December 17: Tightening controls over copper raw materials.

Amendments to CMP Regs. 5 and 7, December 20: Permitting priority ratings for materials for installation of industrial equipment and household appliances.

Amendment to M-75, December 20: Modifying limitations on steel shipping drum inventories to permit packers greater flexibility to operate within their quotas.

Schedule 2 to M-6A, December 28: Prohibiting the distribution of oil-country tubular goods except on authorized controlled-materials orders.

Amendment to M-70, December 28: Permitting wider use of the DO-R-9 rating for minor capital additions under the Marine MRO order.

Amendment to M-68, December 28: Imposing limitations on the production of passenger automobiles in the first quarter of 1952.

Revocation of Dir. 1 and 2 to M-47A, December 28: Eliminating restrictions on the use of iron, steel, copper, and aluminum in consumer durable goods during the third and fourth quarters of 1951.

Dir. 3 to M-25, December 29: Continuing standards for tin-can quotas for the first three quarters of 1952.

Rubber Output Growing

WASHINGTON.—United States production of synthetic rubber will reach the 950,000-ton mark in 1952. 860,000 tons of it GR-S and 90,000 tons butyl. This is just about double the production rate at the close of 1950 and four times the output at the beginning of that year.

Equally important, the quality of product has steadily improved, the two big developments being cold rubber, which will comprise 75 per cent of total GR-S production as soon as the necessary facility conversion is completed, and oil-extended rubber, initially put into production last March, which permits the manufacture of more rubber at lower cost.

The Reconstruction Finance Corp.'s annual report said 3 new GR-S types were developed during the year, raising the total to 33, and 60 new experimental types, raising the total to 650.

The expanded demand for synthetic and the higher price which was put into effect in December 1950 enabled the RFC to show a net profit of $11,927,793 on its rubber operations during the 1951 fiscal year as compared with a loss of $1,794,621 in the preceding year.

Steel Order Tightened

WASHINGTON.—Controls over the distribution of oil-country tubular goods have been stiffened by the National Production Authority.

A supplement to Order M-6A covering steel distributors, prohibits deliveries of casing, tubing, and drill pipe by distributors except on authorized controlled-materials orders, and prohibits operators from accepting delivery of tubular goods from distributors except on such orders.

At the same time, however, NPA canceled provisions of M-6A which gave distributors the privilege of refusing deliveries of steel in excess of specified tonnages, it having been found that the tonnage limitations were too small to meet the minimum requirements for tubular goods to be used in drilling oil and gas wells.

The order, Schedule 2 to M-6A, applies only to domestic transactions. Deliveries by Canadian steel distributors are made only under instructions from the Canadian Department of Defense Production.

"Trouble Shooters" Named

WASHINGTON.—Four marketing experts were appointed in the Petroleum Administration for Defense this week to survey East Coast oil requirements and serve as trouble shooters in the event of unexpected spot shortages which may arise as the result of transportation, weather, or other difficulties during the winter.

Leroy B. Fox, manager of the fuel-oil division of the gasoline and fuel-oil department of Socony-Vacuum Oil Co., Inc., New York; James C. Richdale, Melrose, Mass., assistant to the president, Esso Standard Oil Co.; Gordon C. Currie, Somerville, Mass., manager of the marine division, White Fuel Corp.; and James P. Drainie, New York, general manager of Waller Petroleum Co., will serve without compensation, deputy administrator Bruce K. Brown said.

Brown explained that no oil shortages are expected to occur along the East Coast this winter but PAD will keep alert to the possibilities of spot shortages such as have developed in various areas in past years.

NPC Meets January 29

WASHINGTON.—First 1952 meeting of the National Petroleum Council has been called by Chairman Walter S. Hallanan for January 29, in Washington.

The major scheduled business of the session will be organizational but Hallanan has asked that committees now making investigations requested by the Interior Department last year attempt to prepare reports.

Among the studies on which committee reports may be submitted are oil and gas availability, costs of synthetic production, petroleum truck transportation, underground storage, and patterns needed for oil and gas country tubular goods.

NPC Gains 21 Members

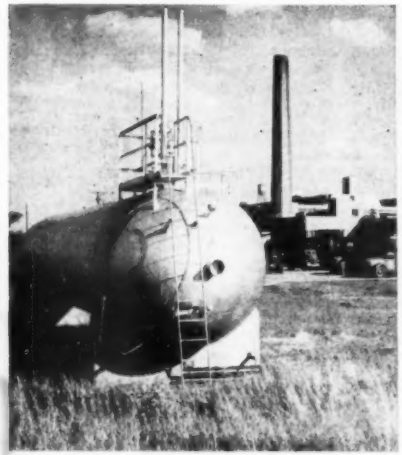
WASHINGTON.—Membership of the National Petroleum Council has been increased to an even 100 this year to give added representation to the marketing branch of the industry.

The makeup of both the NPC and the Gas Industry Advisory Council has been announced by Interior Secretary Oscar L. Chapman, the latter being continued at the 64-member strength at which it was established last March.

Membership of 79 oil men who served with NPC during 1950-51 has been continued. Of the 21 new members, 8 are trade-association presidents, 6 of them replacing presidents whose terms have expired. There were only three changes in the membership of the gas council, all in the nature of replacements.

Among the new members are: Robert O. Anderson, president, Malco Refineries, Roswell, N. M.; Charles H. Arnold, president, Haggart's Service, Inc., Fargo, N. D.; Fred E. Bergfors, president, Quincy Oil Co., Quincy, Mass.; Robert H. Colley, president, Atlantic Refining Co., Philadelphia; Paul Endacott, president, Phillips Petroleum Co., Bartlesville, Okla.; Max M. Fisher, president, Aurora Gasoline Co., Detroit.

Clyde T. Foster, president, Standard Oil Co. (Ohio), Cleveland; Harry K. Franklin, Minneapolis; Charles S. Hill, president, Rocky Mountain Oil and Gas Association, Denver; R. G. Lawton, president, Lawton Oil Co., Magnolia, Ark.; John White, president, Hewitt Oil Co., Charleston, S. C.; John Wrather, Longview, Tex., and C. H. Wright, president, Sunray Oil Corp., Tulsa.



INDUSTRIAL USE.—This is a typical L.P.G. installation serving an industrial plant. The product is becoming increasingly valuable as standby fuel for plants using natural gas.

DOMESTIC USE.—A farmer is shown fueling his L.P.G.-powered tractor from the same tank that supplies L.P.G. for heating and cooking purposes in his home. Other farm uses include pumping and irrigation, brooder heating, and flame weeding.

K. W. RUGH

G. R. BENZ

L.P.G. Records Fall

Spot shortages expected as demand keeps soaring; 1951 output of 4.1 billion gallons is increase of 25.9 per cent

Presented here is the annual year-end review of the liquefied-petroleum-gas industry prepared by two officials of Phillips Petroleum Co., Bartlesville, Okla.

K. W. Rugh is assistant manager of the Phillips sales department, and George R. Benz is manager of the company's engineering department.

Highlights

Sales of L.P.G. reached new all-time high of 4.1 billion gallons in 1951, a gain of 25.9 per cent over 1950.

Demand is expected to continue its upward trend in 1952.

Combined use of L.P.G. for domestic purposes and as motor fuel in 1951 is estimated at 2,868,000,000 gal., a jump of 32.5 per cent over 1950 and more than total industry sales in 1949.

Sale of L.P.G. for manufacture of chemicals reached a new peak of 750,000,000 gal., an increase of 22.5 per cent over 1950.

Storage remains a major problem, but shortage fears are encouraging construction of additional facilities near points of consumption.

THE liquefied-petroleum-gas industry in 1951 sold a record 4.1 billion gallons of L.P.G. to register its biggest sales-volume increase in history.

Total sales were 845,918,000 gal. greater than those of 1950, a jump of 25.9 per cent. The new peak maintained the industry's habit of reaching a new high every year since it began keeping records in 1922.

Illustrating the rate of growth of the industry is the fact that the amount of 1951's increase over 1950 is greater than total sales in 1943 and almost equal to total sales in 1944.

The 4.1-billion sales figure does not include L.P.G. used in the manufacture of aviation gasoline or synthetic rubber. It is estimated that the synthetic-rubber industry alone used 344,000,000 gal. during 1951 compared with 228,485,000 gal. in 1950.

Even with the tremendous gains in production, there still are complaints of inadequate supplies in some areas, and the industry is anticipating shortages during the winter months, particularly if colder-than-normal weather occurs.

Domestic and motor-fuel use.—Sales of L.P.G. for fueling internal-combustion engines and for domestic uses are estimated at 2,868,000,000 gal. in 1951. This is a 32.5 per cent increase over 1950 and is more than the total sales of the entire industry as recently as 1949.

This classification includes all L.P.G. sold direct as engine fuel plus all sales by distributors. Actual breakdown by uses is impossible since a single tank on a farm often is used for fueling tractors or trucks as well as for home heating, cooking, pumping, flame weeding, or other purposes.

Factors in 1951's increased sales include unusually cold weather early in the year, increasing the home-heating fuel demand; colder-than-normal weather in the fall and early winter; and a long dry spring and summer in some areas which increased the demand for irrigation-pump fuel.

It is estimated that there are now 8,000,000 L.P.G. installations on farms and in suburban areas, served by 4,500 bulk plants.

During the past year an estimated 470,000 ranges were produced specifically for use with L.P.G.; about 260,000 automatic water heaters were manufactured for L.P.G.; and 19 per cent of all gas-fired floor and wall furnaces turned out in 1951 were made for L.P.G.

Direct motor-fuel use of L.P.G. continued its rapid gain in 1951, increasing both on farms and in the bus and

MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GAS

Year	Total sales: Gallons (in thousands)	Total sales: Per cent increase	Distribution (thousands of gallons): Domestic and motor fuel*	Per cent increase	Industrial and misc.†	Per cent increase	Gas mfg.	Per cent increase	Chemical mfg.	Per cent increase
1922	223									
1923	277	24.4								
1924	376	36.0								
1925	404	7.2	Sales confined primarily to bottled gas prior to 1928							
1926	465	15.2								
1927	1,091	134.6								
1928	4,523	314.6	2,600		400		1,500			
1929	9,931	119.6	5,900	126.9	1,500	275.0	2,500	66.7		
1930	18,017	81.4	11,800	100.0	2,200	46.7	4,000	60.0		
1931	28,770	59.7	15,295	29.6	7,172	226.0	6,303	57.6		
1932	34,115	18.6	16,244	6.2	8,167	13.9	9,703	53.9		
1933	38,931	14.1	16,626	2.3	13,987	71.3	8,318	-14.3		
1934	56,427	44.9	17,681	6.3	32,448	132.0	6,298	-24.3		
1935	76,855	36.2	21,380	20.9	47,894	47.6	7,581	20.4		
1936	106,652	38.8	30,014	40.4	67,267	40.4	9,371	23.6		
1937	141,400	32.6	40,823	36.0	62,610	(‡)	11,175	19.3	26,792	
1938	165,201	16.8	57,832	41.7	62,694	0.0	12,386	10.8	32,299	20.5
1939	223,580	35.3	87,530	51.4	93,723	49.4	15,435	24.6	26,892	-16.7
1940	313,456	40.2	134,018	53.1	124,482	32.8	20,285	31.4	34,671	29.0
1941	462,852	47.7	220,722	64.7	172,669	38.6	25,255	24.5	44,206	27.5
1942	585,440	26.5	303,857	37.6	197,179	14.2	31,366	24.2	53,038	20.0
1943	675,233	15.3	344,962	13.6	237,396	20.4	37,519	19.6	55,356	4.4
1944	898,071	33.0	445,617	29.2	254,590	7.3	45,879	22.3	151,985	175.0
1945	1,067,979	19.0	533,262	19.7	256,577	0.8	53,849	17.4	224,291	47.5
1946	1,410,370	32.1	758,466	42.2	253,745	-1.1	86,660	61.0	311,499	38.8
1947	2,008,262	42.4	1,150,538	51.7	274,125	8.0	169,332	95.4	414,267	33.0
1948	2,511,160	25.0	1,473,289	28.1	275,883	0.6	237,638	40.3	524,350	26.6
1949	2,658,749	5.9	1,627,550	10.5	247,103	-10.4	239,210	0.6	544,886	3.9
1950	3,254,082	22.4	2,034,464	24.9	355,456	(§)	251,694	5.2	612,468	12.4
1951	4,100,000	25.9	2,868,000	(§)	230,000	(§)	252,000	0.0	750,000	22.5

*Household use plus irrigation pumping, tractor fuel, flame weeding, chicken brooding, and similar uses. Included also is L.P.G. sold by domestic distributors but used for industrial purposes, internal-combustion-engine fuel and for gas-manufacturing purposes. Included also, in 1951 only, is L.P.G. sold direct by producers and marketers solely for fueling internal-combustion engines. (See special note.)

†For all years prior to 1951, includes L.P.G. sold for fueling internal-combustion engines. (See special note.)

‡Not comparable due to segregation of chemical manufacturing.

§Not comparable due to change in method of reporting L.P.G. sold for fueling internal-combustion engines.

REMARKS: In this table total sales for all years except 1951 were obtained from U. S. Bureau of Mines reports. Distribution for 1931 to 1950, inclusive, was obtained from the same source. All other volumes were estimated by the writers. The total sales volume includes all L.P.G. (propane, butane, and propane-butane mixtures) when sold as such. Until 1944 the sale of pentane for any purpose other than motor-fuel blending was included. Since then it has been excluded. It does not include butane when blended with heavier petroleum fractions for motor-gasoline purposes. Intercompany sales transactions such as purchases of L.P.G. by one company from other companies and resold as L.P.G. have been eliminated in order to avoid duplication of sales figures. The data do not reflect sales of L.P.G. used directly by the producer at the point of production for fuel polymerization, solvent dewaxing, etc. Neither do the figures include sales of hydrocarbons to plants manufacturing synthetic rubber or aviation gasoline or their components.

truck industries. Sale of L.P.G. conversion equipment for farm tractors continued at a high level, and factory engineered and produced L.P.G. tractor models were announced by two additional manufacturers.

Use of the product by trucks, buses, and taxi fleets reached notable new highs in 1951, and several major manufacturers of heavy-duty engines are reported considering production of factory-engineered and produced L.P.G. engines. In some cases the engines have reached the road-testing stage.

Industrial use. — Sales for industrial and miscellaneous uses are estimated at 230,000,000 gal. for the year, a 2 per cent gain over 1950.

The last quarter brought a definite upsurge in sales to industry as a result of new plant operations in the stepped-up defense program. Decentralization also was credited with some increase in demand as many plants moved to locations beyond gas mains.

Counterbalancing these factors was the increased availability of natural gas in some industrial areas and also temporary shutdowns as some plants switched from production of consumer goods to defense items. Further increases in L.P.G. sales to industry are anticipated as defense production continues to rise.

Utilities.—Sales in this field are estimated at 252,000,000 gal., unchanged from 1950.

Two factors were primarily responsible for the lack of a gain here: Extension of gas lines into new areas, and the extreme shortage of L.P.G. transportation facilities early in 1951.

Short-term effect of the gas-line-expansion program is expected to be a reduction in L.P.G. demand. However, the long-term view is for increased demand for standby purposes.

Chemical manufacture.—Sales for this purpose again reached an all-time high, rising to an estimated 750,000,000 gal., an increase of 22.5 per cent over 1950.

The high rate of construction of new petrochemical plants, many of which use L.P.G. as a basic raw material, assure an increasing demand for the product in the future.

Outlook.—Progress in 1951 indicates a continuing increased demand for L.P.G. comparable to that experienced in the past.

There are indications that production will have difficulty in keeping pace with demand during the peak winter months. Threats of shortages are posed by inadequate storage at all stages of distribution channels and the possibility that production may not meet spot demand at all times during January and February.

The current unbalanced condition between supply and demand is influencing construction of additional storage. Underground-storage projects will add tremendously to the availability of L.P.G. in consuming areas, but many now completed were not finished soon enough to permit filling them during the summer months, so their effect will be more fully realized during the 1952-53 winter.

Another reason for the current tight supply situation is due to the fact that some major producing sources had difficulty getting "on stream." Also, others that were brought in produced disappointing volumes.

At many refineries, C_4 and C_5 hydrocarbons in increasing quantities are now being converted to motor and aviation gasoline by polymerization and alkylation processes which yield the refiner better return than if sold for L.P.G., taking this amount of product out of normal availability.

Also, the change from 13.5 to 15-lb. R.v.p. motor gasoline during the winter months in northern areas may require as much as 420,000,000 gal. of butane more than heretofore.

World-Wide Cartel?

"Big Five" split markets, fix prices, avoid competition, Elmer Patman tells Congress; investigation seems probable

Henry D. Ralph

CHARGES that the American oil industry is being squeezed out of both the domestic and foreign market by a combination of five groups of international oil companies may be aired before congressional committees this spring.

The groundwork for such an investigation—in fact, a ready-made prima facie case—was laid before House and Senate committees on small business last week by Elmer Patman, an oil attorney of Austin, Tex.

Under appointment of his cousin, Rep. Wright Patman of Texarkana, Tex., Elmer Patman attended the World Petroleum Congress at The Hague last May and June as official representative of the two committees. Wright Patman is chairman of the House group, and the appointment was concurred in by Sen. John Sparkman of Alabama, chairman of the Senate committee. The committees did not pay his expenses outside of the United States.

Elmer Patman's report on the World Petroleum Congress is strikingly different from others which have been made by numerous Americans who attended. Instead of a scholarly gathering for the exchange of technological information, he saw it as a front for a deep-laid plot to make Middle East oil dominate the petroleum trade of the world.

Who Patman is.—This should not be surprising to those who know Elmer Patman. In many Washington proceedings over the past decade he has been active in espousing the position of independent producers as against allegedly monopolistic and oppressive actions of major companies. He took a prominent part in the long fight which resulted in the rejection of the Anglo-American oil treaty, which he helped to paint as a scheme to crowd independents out of world markets.

Elmer Patman is attorney for Superior Oil Co., which, directly and indirectly, has an interest in a number of oil concessions in the Middle East, none of which has yet found production.

The World Petroleum Congress, Elmer Patman reported to Wright Patman, was set up for four purposes:

1. To lay the groundwork for conditioning the United States and world opinion to the fact that untold reserves of oil exist in the Middle East;

2. To develop a price-structure plan and an allocation of markets to the oil-producing areas which will relegate the United States to a position of growing dependence upon oil imports;

3. To break the news to the domestic United States oil industry that its future role in world oil will be a minor one, serving only to maintain desired price levels for the rest of the world, based on high United States costs of production;

4. To sell the idea that the present cartelized international oil industry is essential and that only harmful effects would result from any change in structure.

These conclusions were strengthened in Elmer Patman's mind by his visits to seven European countries after the WPC adjourned, and by his observations of the handling of the shortage resulting from the Iranian shutdown. Everything fits into a pattern, he reported to the congressional committees, a pattern of world domination by what he calls the "Big Five."

The conspirators.—The Big Five, as Patman describes them, are (1) Anglo-Iranian Oil Co.; (2) the Royal Dutch-Shell group of companies and Burmah Oil Co.; (3) Standard Oil Co. (N.J.) and Socony-Vacuum Oil Co.; (4) The Texas Co. and Standard Oil Co. of California; and (5) Gulf Oil Corp.

By means of joint operations, oil contracts, and international cartels (As-Is Agreements), Patman says, these companies work together to control the world's oil industry.

"These facts," the Patman report asserts, "are of extreme importance to the American people in general and to American small business in particular. They show a world-wide plan which, if allowed to be carried out, will destroy one of America's largest small businesses. In effect, it would eliminate free competition in oil which is of great strategic importance, as well as the biggest single item in international trade."

Source of revelations.—What he calls the "economic facts of life" about the international petroleum situation were unveiled to Elmer Patman by three papers presented at The Hague conference.

The first was by G. M. Lees, chief geologist of Anglo-Iranian, which described the "unbelievable richness" of the oil fields of the Middle East. To Patman, the enormous potentiality and low-cost production of this area spells the doom of American producers.

The second was by Walter J. Levy, New York consultant, on "The Past, Present, and Likely Future Price Structure for the International Oil Trade." Here Patman found the details of a scheme to keep American oil out of world markets but to use high United States producing costs to hold up market prices of cheap oil produced elsewhere.

The third was "The Significance of the Marshall Plan for the Petroleum Industry in Europe," by E. Groen, an official of the Dutch-Shell group temporarily serving as secretary of the Netherlands Government Office for Petroleum and on the staff of the Organization for European Economic Cooperation. This paper revealed to Patman how American funds are building up European refining capacity so as to shut American oil out of European markets.

The chief villain of the piece, according to Patman, is Walter J. Levy. He points out that Levy has served or is serving as consultant to the Jersey, Caltex, and Shell groups of companies, to the Venezuelan Government, to the U. S. Economic Cooperation Administration, and to the Harriman mission to Iran. Patman calls Levy "probably the most influential economist in world oil today .... His words have weight."

Operating plans.—Here are the outlines of the plot, as Elmer Patman outlined in his report as official observer for the congressional small-business committees:

The Big Five have decided to produce the Middle East at high rates immediately because the reserves "can supply all world oil demands for 50 years," producing costs are low, and single ownership of the surface by the sovereign eliminates the troublesome problems of leasing, correlative rights, well spacing, and proration found in the United States.

Markets will be allocated to producing areas in such a way that competition will be reduced to an absolute minimum. "The United States oil-price structure, based on a dynamic competitive economy, diverse ownership, and high cost of production, will continue to set world oil prices in spite of United States production being effectively removed from the market. United States production will be subsidized, if necessary, to maintain oil prices at the present 'deal' level from the standpoint of the international oil cartel."

The United States will be relegated to a permanent position as a large importer of oil, and will be allowed to produce only enough oil to partially meet its own needs, supple-

mented by the Caribbean crude and fuel oil which cannot yet be sold in South America, and later by Canadian crude.

Into this scheme the Marshall plan fits like a hand in a glove, as Patman sees it.

Before World War II, Europe was a prime customer for United States oil. The Big Five largely kept away from European refining, and independent refineries were projected to use American crude. The oil committee of the O.E.E.C., which administers Marshall plan funds in Europe, is dominated by henchmen of the Big Five, and as a result European purchases of American oil with Marshall plan funds have been kept to a minimum.

Most of the new refining capacity being built in Europe is under the control of Big Five companies, and these plants will run on Middle East crude. Caribbean crude thus displaced from Europe will be forced onto the United States market. Western Europe may even become an exporter of petroleum products.

Documentation.—As an exhibit to his report, Patman attached an analysis of the European refining and marketing situation (possibly prepared by himself since no source is given), which he says shows how the independent petroleum business has been virtually abolished in a number of countries during the past 4 years, and that "the stage is clear, with competition removed, for market divisions and agreed monopolies covering all of Western Europe."

Proof of the plot was found by Patman in the handling of the shortage that developed when Iran nationalized its oil industry last summer.

The Big Five effectively boycotted Iran's oil, and the other four pitched in to meet Anglo-Iranian's deficiency in supply. Asiatic Petroleum Corp. was appointed sole purchasing agent in the United States, thus eliminating competition and preventing independent producers from benefitting in higher prices even though their crude was in great demand.

The U. S. Petroleum Administration for Defense induced the Department of Justice not to bring antitrust action against the three American members of the Big Five, and others, for cooperative action in carrying out this plan. Then PAD brought pressure on state conservation bodies to increase domestic crude production. After the Texas Railroad Commission "did not dance to the tune played by PAD" and production was cut back again in the United States, PAD called for an increase in output by Venezuela "owned 94.9 per cent by the Big Five," and allocated steel for increasing foreign production.

Points raised.— All this looks suspicious and more than coincidental to Elmer Patman, and he concluded his report with a lot of questions:

"If the 650,000 bbl. of Iranian oil should come back into the Western Hemisphere market, someone would have to cut production still more. Under the PAD agreement of June 25, there is little doubt that this cut will be in domestic United States production, mostly in Texas. This will be an effective vehicle for squeezing out more of the independent refiners and producers, if we are to judge by the results of past squeezes on crude supply in the United States.

"It would be interesting to know, in this entire operation, whether through the emergency previously outlined herein, the PAD has allocated more oil-country tubular goods to so-called foreign operators, in truth and in fact the Big Five, than a reasonable yardstick would indicate, bearing in mind that the allocations to the same group for domestic operations have been unconscionably large.

"Have the international oil companies entered into agreements in this entire situation over and beyond the scope reasonably necessary to fill the gap in world-wide supply caused by the Iranian shutdown?

"Under free economic play of the law of supply and demand, would taking 650,000 bbl. of oil out of the western markets have been calculated to put pressure on prices to the end that prices would have gone up; and has the single-shot cartel action of Asiatic, as sole purchaser, prevented a price increase in the United States?

"These are only a few of the many questions arising in international oil as a result of the revelations at the Third World Petroleum Congress at The Hague. The answers to these questions are in themselves answers to the broader question of whether we will maintain any vestige of a competitive free-enterprise economy in the petroleum industry at home or abroad."

If Wright Patman's reaction to Elmer Patman's report can be forecast by his previous actions as champion of small business in general and independent oil producers in particular, it is a good bet that charges that an international cartel is squeezing American oil industry will be aired in Congress during the present session.

Cartel Denied

Companies say agreements Patman alleges don't exist

Dahl M. Duff

NEW YORK.—Charges of Elmer Patman, Austin, Tex., attorney, that a half dozen of the world's largest oil companies are involved in an international cartel have been denied by representatives of the companies concerned.

Patman's allegations named Shell, Anglo-Iranian Oil Co., Ltd., Standard Oil Co. (N. J.), Gulf Oil Corp., California Texas Oil Co., Ltd., and Socony-Vacuum Oil Co., Inc.

These companies control all the production of the Middle East except for the interest of the French company, Cie. Francaise des Petroles.

Caltex, Shell, Jersey Standard, and Gulf all denied any connection with or knowledge of such an international oil cartel as that described by Patman in his report to the Senate and House small-business committee. S. A. Swensrud, president of Gulf, said his company is not a party to any program in the United States or abroad with any other oil company which seeks to develop or control prices or allocations of markets.

Walter J. Levy, New York oil economist and consultant to several large companies, said Patman's assertion that he had blueprinted the cartel plan was absurd.

Patman acts as attorney for Superior Oil Co. At present, Superior is attempting to develop production in the Persian Gulf and in partnership with the Trinidad Leaseholds, Ltd., interests is exploring the offshore waters of Qatar.

Unit Backed

Authority of committee is upheld in Stanolind case

DENVER. — The operating committee of a unitized oil field has the final word in determining how its wells shall be operated, the circuit court of appeals here has ruled.

The court held that West Edmond Hunton Lime Unit was entitled to an injunction preventing Stanolind Oil & Gas Co. from interfering with its unit operation. In its ruling, the court reversed a decision handed down by U. S. District Judge Stephen S. Chandler.

The case involved operation of a dually completed well in Oklahoma's West Edmond field. The Hunton lime reservoir is unitized but the Bartlesville sand, 280 ft. above the Hunton, is not.

Stanolind recently had worked over a nearly depleted Hunton lime well to permit simultaneous production from the Bartlesville. The dual completion was arranged so that Hunton production was through the tubing and Bartlesville production was through the annular space between tubing and casing.

The unit had contended that as unit operator it owned all well-head equipment and had full authority over its use.

Stanolind insisted that it would be put to a great deal of expense to drill another well to the Bartlesville, when only a small amount of oil remained to be produced from the Hunton formation.

The district court had ruled that the great injury to Stanolind and the

small loss, if any, to the unit, were the controlling factors.

In reversing this decision, the circuit court said Stanolind must be governed by the contract it made when it joined the unit and that the decision should not be determined by the monetary loss or benefit to the parties.

The court added that the key question involved was whether operation of the dual completion "interferes with the convenient management, operation, and further development of the unitized zone." But this question, it said, should be answered, not by court, but by "those to whom has been entrusted the responsibility for operating the unit. . . ."

SEC Approves Merger

WASHINGTON.—The last obstacle to the merger of Colorado Interstate Gas Co. and Canadian River Gas Co. was removed here last week when the Securities and Exchange Commission gave its approvel.

Southwestern Development Co. may now divest itself of Canadian River stock and distribute it to Southwestern shareholders. It also will distribute its 42.5 per cent stock interest in Colorado Interstate to the shareholders.

Mission Oil Co., which owns a minority interest in Southwestern, was ordered by SEC to distribute its Canadian River and Colorado Interstate stock to its shareholders and dissolve itself.

Sinclair Oil Corp., which owns a majority of Southwestern's stock, can sell Colorado Interstate and Canadian River stock it receives under the agreement and reinvest the proceeds in Sinclair Refining Co.

A new company, Westpan Hydrocarbon Co., has been organized to receive Canadian River's rights to certain gasoline.

The merger agreement went into effect January 1. Colorado Interstate, a gas-distribution company, was authorized by the Federal Power Commission last summer to acquire Canadian River's production in Texas Panhandle field.

Synthesis Plant Ends Run

PITTSBURGH.—The Bureau of Mines' new gas-synthesis demonstration plant at Louisiana, Mo., has successfully completed its second integrated test run.

The run lasted 25 days, during which the plant processed more than 700 tons of coke and 450 tons of 95 per cent pure oxygen to make 52,000,000 cu. ft. of synthetic gas. The bureau said about 75 to 85 per cent of the gas was converted to oil during a single pass. Bureau technologists think that the process can be operated with a single-conversion stage instead of two if this yield can be raised to 90 per cent.

John J. Forbes, bureau director, said that appreciable quantities of representative products were made, although the primary purpose of the run was to show that all phases of the process and equipment were operable and no attempt was made to obtain maximum output.

The run followed an 8-day shakedown test last September after which certain adjustments were made.

CANADA

Alberta Gas Line Completed

EDMONTON, Alta.—Canadian Pipeline Corp. has completed a $3,500,000 natural-gas pipe line from Pakowki Lake gas field in southeastern Alberta to Shelby, Mont.

The 75-mile project is the first natural-gas line from Alberta to the United States. Its construction to carry a limited amount of gas out of the country for the exclusive use of Anaconda Copper Mining Co., a defense-essential industry, was authorized by a special bill passed by the Alberta Legislature.

No gas has been delivered as yet, however, due to the failure of the U. S. Federal Power Commission to grant a permit for importation into the United States. Coal interests in this country are actively opposing issuance of the permit at hearings before FPC.

The new line connects at its southern terminus with lines of Montana Power Co., which supplies Anaconda, at Shelby. The Alberta gas would replace dwindling supplies from Montana's Kelvin-Sunburst field for use in processing copper, zinc, and other defense materials. The Alberta Legislature authorized the export of a maximum of 43,800,000 cu. ft. of gas daily over a 5-year period.

Husky Buys Oil Holdings

LLOYDMINSTER, Sask. — Husky Oil & Refining Co., Ltd., Canadian subsidiary of Husky Oil Co., Cody, Wyo., has bought all black-oil holdings in this area belonging to Commonwealth Petroleum, Ltd.; Commoil, Ltd.; Command Oils, Ltd.; Command-Yorktown, Ltd.; and Command's interest in Command-Globe, Ltd.

The properties include 36 producing oil wells in the Lone Rock and Blackfoot areas as well as about 14,000 acres of undeveloped land. Also included in the transaction were a machine shop and yards, operating equipment, and other properties. Purchase price was reported in excess of $1,000,000.

Most of the properties involved are adjacent to Husky's present holdings in the Lloydminster area and near the company's refinery here. The company now has six rigs operating in the area.

Industry Briefs

MONTGOMERY, Ala. — Alabama's Supreme Court has held that an oil company must pay tax on its equipment because drilling in Alabama is not a mining operation. The ruling was handed down on appeal from a lower court decision which denied Carter Oil Co. a refund on use taxes it paid under protest. Mining machinery is exempt from the state use tax, which is levied on materials purchased outside the state but used in Alabama.

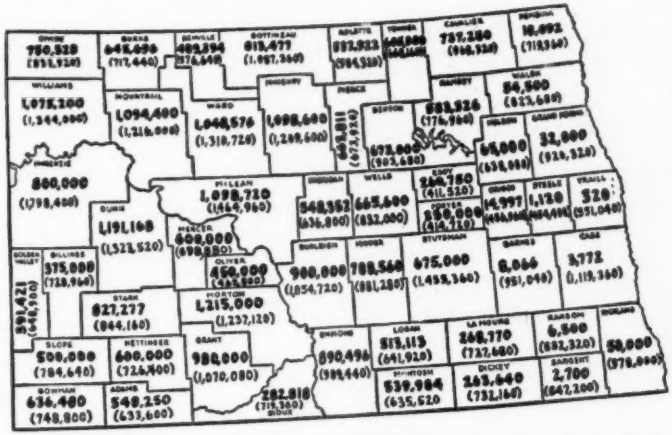
CASPER, Wyo.—Great Lakes Oil & Chemical Co. of Grand Rapids, Mich., has completed negotiations for acquisition of 90 per cent of Olds Oil Corp.'s stock. The latter firm operates in the Rocky Mountain area, Indiana, Illinois, and Kentucky. It has five drilling rigs. There are now 940,202 shares outstanding.

AUSTIN.—Oil stored on January 1 in the county where it is produced is subject to county ad valorem taxes although it is in process of being moved to another county. The Texas Supreme Court, in refusing to review the decision, in effect upheld an earlier opinion allowing Nueces County to collect property taxes on oil in tanks on January 1 prior to being piped to Crown Central Petroleum Co.'s Harris County refinery.

WICHITA. — National Cooperative Refinery Association has purchased the entire 450-bbl. daily production of Bart-Staff field in Barton and Stafford counties, Kansas, for a consideration reported to be about $1,000,000. Tom Palmer, Wichita independent who discovered the area this year, made the sale.

LOS ANGELES. — Stockholders of Southern California Petroleum Corp. have authorized a new issue of 250,000 shares of $25 par cumulative preferred stock, of which 112,000 shares will be offered publicly shortly to finance purchase of Culbertson & Irwin, Inc., New Mexico oil corporation with properties in West Texas and southeastern New Mexico.

DENVER.—Dr. Victor Ziegler, head of Bonanza Oil Co. of Wyoming, announced here that prospective sale of the firm to two Texas companies "has fallen through." The prospective purchasers were Nino Oil Corp. and Title Investment Co., who canceled their contract to buy.



UNDER LEASE.—This map shows by counties the amount of land now leased in North Dakota. Figures in parentheses are total acres in each county; bold figures above indicate number of acres under lease.

Spacing Rule Awaited

Hearings to open January 16 on pattern for North Dakota's first proven field; interest still high in new oil state

BISMARCK. — North Dakota's first brush with problems of oil regulation and conservation will occur January 16 when the State Industrial Commission opens hearings on the application of Amerada Petroleum Corp. for 80-acre spacing in Beaver Lodge Madison pool of Williams County.

Beaver Lodge is the state's only proven oil field and covers approximately 36,000 acres. It is currently producing from only the discovery well, but four more wells are drilling and two more are rigging up. State regulations provide for 40-acre well spacing except on special order of the commission.

Although the Amerada application applies only to this field, it has caused considerable opposition from other parts of the state where there is wildcatting or leasing activity. A number of independent operators as well as spokesmen for landowners and royalty owners are expected to oppose the application, and the subject has created great interest among laymen in this brand-new oil state.

Claims steel saving. — Amerada will argue that the proposed rule will save drilling steel while proving up large areas more quickly than 40-acre spacing, and that the drilling pattern will be such that infill drilling may be done on a closer spacing pattern later if found desirable. It also contends that wider spacing at this time will more quickly determine the outlines and reserves of the field and this in turn will hasten the construction of a pipe-line outlet for Beaver Lodge crude.

Opponents are expected to charge that Amerada is attempting to retard development of the area and to drill only enough wells to hold leases which will expire in the near future unless developed. Owners of small tracts and leases have expressed the fear that 80-acre spacing would prevent them from sharing in oil development in the area.

Interest high.—Interest in oil activity is running high throughout the state, although the leasing play is beginning to taper off. A survey made last week by the Fargo Forum showed that 28,228,666 acres are under oil and gas lease, which is 62 per cent of the 44,834,560 acres in North Dakota. These leases are in every one of the state's 53 counties, as shown in the accompanying map prepared by that newspaper.

This figure does not include leases on state and federal lands, and a number of county registers of deeds are not up to date with their records, so the Forum estimated that probably 30,000,000 acres in the state are covered by oil and gas leases. A survey made by the newspaper last May showed 23,930,284 acres under lease at that time.

In a special review of the oil activity in the state, the Forum estimated that between $100,000,000 and $175,000,000 has been spent in the search for oil in North Dakota since 1947, considering the sums spent for leases, exploration, drilling, transportation, housing, and other activities of large and small oil operators.

SOUTHWEST

Gas-Tax Fight Warms Up

AUSTIN.—The second round of the battle over payment of Texas' new gas-gathering tax was opened last week when seven pipe-line companies filed suits in three Travis County courts seeking recovery of nearly $1,000,000 in protested payments.

Legality of the tax was contested in the suits on the basis that it is an undue burden on interstate commerce and that the state's definition of gas gathering is erroneous.

Companies filing the suits were Texas Gas Transmission Corp., Cities Service Gas Co., Natural Gas Pipe Line Co., Texas Eastern Transmission Corp., Texas Illinois Natural Gas Pipe Line Co., Michigan-Wisconsin Pipe Line Co., and Panhandle Eastern Pipe Line Co.

West Texas Gulf Contracts

HOUSTON.—West Texas Gulf Pipeline Co. has let a contract to Anderson Bros. Corp., Houston, for 50 miles of its proposed 581-mile West Texas-Gulf Coast line.

The portion to be built by Anderson, a 26-in. line, will extend from Grandbury eastward to Wortham. Anderson will begin work within a week, with offices set up at Glen Rose, and Rusty Killinsworth will serve as superintendent.

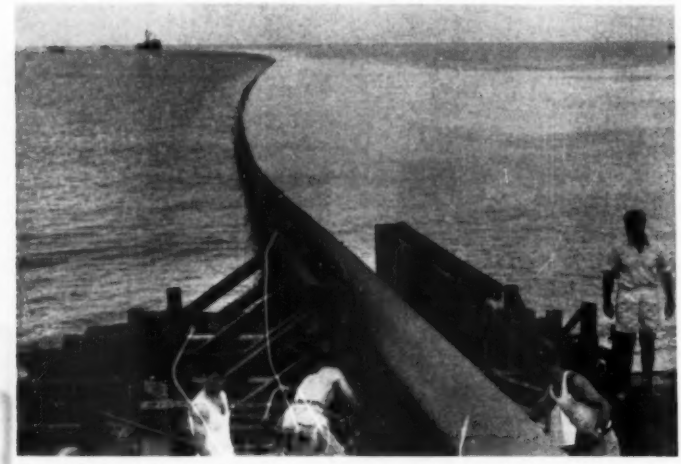
WEST COAST

Impounded Funds Released

LONG BEACH, Calif. — Three oil-purchasing companies, Standard Oil Co. of California, Hancock Oil Co., and Signal Oil & Gas Co., have lifted restrictions on a total of $5,000,000 in tidelands oil revenue and will turn it over to the Long Beach Harbor Department.

Another $5,000,000 will be released to Long Beach Oil Development Co. by the firms for use in paying the first dividend since 1948.

The money which will go to the Harbor Department will be in addition to $4,500,000 which will be released during the next 6 months, but which must be used only for subsidence remedial work.



SEA LINE.—One of the Banias sea lines, approximately half pulled from the launching strip, as it was being moved for floating into position.

MIDDLE EAST

I.P.C. Line Pushed

Initial operation scheduled in April for 554-mile, 30 and 32-in. crude-oil line from Kirkuk field to Banias

Dahl M. Duff

WORK on the new 30 and 32-in. pipe line of Iraq Petroleum Co., Ltd., is being carried forward rapidly under an accelerated construction program which calls for initial operation next April.

The 554-mile line extends from Kirkuk field in Iraq to a new tanker terminal on the eastern Mediterranean Coast at Banias, Syria. It will be the second large-diameter line delivering Middle East oil to the Mediterranean. The first, Trans-Arabian Pipe Line Co.'s 30 and 31 in., was completed late last year.

Construction of the I.P.C. line got under way as soon as possible after the last of the Tapline pipe was manufactured. The main-line pipe for both projects came from the Consolidated Western Steel Corp. plant at Maywood, Calif.

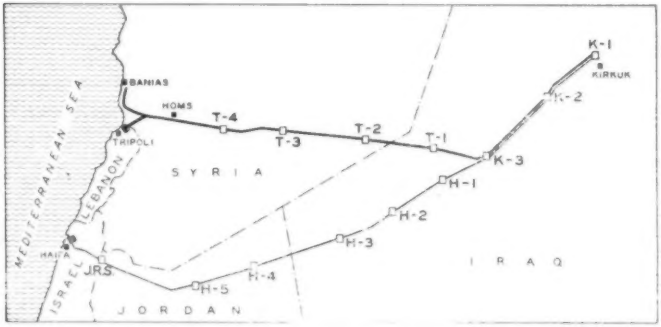
Contract for the I.P.C. line construction was let to Arabian Bechtel Co., and the first weld was made November 28 of last year. The original program was for 26 miles a month with one full spread. Subsequently, a splinter gang was introduced to effect an improvement in the rate of laying.

In view of the urgent world demand for oil, a speeded-up construction schedule was decided on in August. During the last 2 months the splinter gang has been augmented to form a second full spread, and the new program provides for the laying of 30 miles a month by each spread.

Early completion urgent.—Early completion of the I.P.C. line is of the utmost significance, particularly in that it will make available large quantities of additional crude to European refineries. Beginning in April, about 100,000 bbl. daily will be moved to Banias. Further work on the line and the pump stations will allow this to be stepped up during the year to 275,000 bbl. daily in September, and to 314,000 bbl. daily capacity early in 1953.

I.P.C. laid the first lines to the eastern Mediterranean in 1934. These were two 12-in. lines leading out of Kirkuk and bifurcating at Station K-3 on the Euphrates River. The north branch runs to Tripoli in Lebanon, and the other to Haifa in Palestine. After the war, the company augmented this system by laying parallel 16-in. lines, thus providing four separate lines from Kirkuk to K-3 and one 12 and 16-in. to each of the terminals.

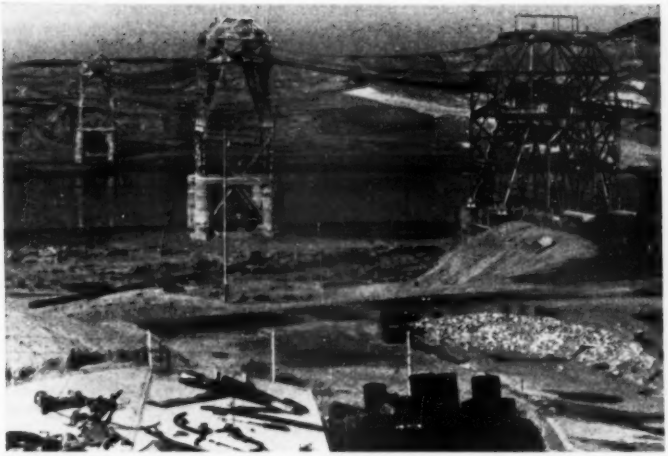
Construction of the 16-in. line to Haifa was halted at the Palestine frontier as a result of the disturbed conditions in Palestine, and since the spring of 1948 all deliveries through the Haifa branch of the 12-in. line have been suspended. Station and line maintenance is being carried out, but the new 16-in. and the old 12-in. lie idle. The north lines to Tripoli are carrying about 160,000 bbl. daily, the maximum throughput possible.



I.P.C.'S SYSTEM.—Map of International Petroleum Co., Ltd.'s, pipe-line system from Kirkuk to the Mediterranean Sea. Heavy line designates the new 30-32-in. pipe line now under construction from Kirkuk to Banias and existing 12-in. and 16-in. lines from Kirkuk to Tripoli. Lighter line, bottom, indicates an existing 12-in. carrier from Kirkuk to Haifa, and a 16-in. line from Kirkuk to the Israel border, where construction was stopped. Neither of the two latter lines are in operation.

Lines parallel.—The new 30 and 32-in. parallels the existing lines out of Kirkuk to Station K-3 and then follows the north (Tripoli) branch to Mile 494 from Kirkuk. At that point, the new line leaves the route of the 12 and 16-in. and extends west and north to Banias.

The point of highest elevation on the line is at Mile 466 from Kirkuk where the elevation is 2,537 ft. From this point to Banias, a distance of 88½ miles, 26-in. pipe, manufactured by National Tube Co., Lorain, Ohio, is being laid. This is a gravity-flow



CABLEWAY.—This new installation with capacity of 23 tons was built by I.P.C. over the Tigris River. It replaces ferries and a lighter cableway used previously.

section with the line dropping from 2,537 ft. to about 1,600 ft. at the Orontes River, Mile 483, and, after another rise, falling to sea level at the terminal in Banias.

Bechtel's original spread began working eastward on the 26-in. pipe at Mile Post 503 and the splinter gang, on formation, was employed between Banias and this point. The original program called for having the 30 and 32-in. into K-3 by July and to Station K-1 (Kirkuk) by the end of 1952.

Splinter gang expanded.—The splinter gang has now been expanded to a full-strength spread, and on completion of the Banias to Mile 503 section, will move into Iraq to begin working eastward from the Iraq-Syrian border. It is now anticipated that the line will be completed from Banias to K-3 by early February. Since additional capacity is now available in the two 12-in. and the two 16-in. from K-1 to K-3, crude can be moved through the K-3-Banias section of the new line as soon as testing and filling is completed in April. The K-3 Banias section is 405 miles long.

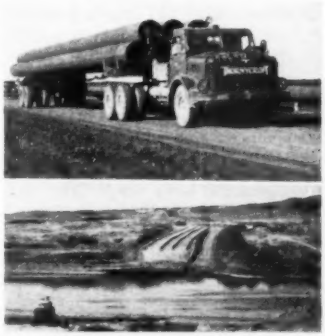
By the end of April, the entire line will be laid with the completion of the 30 and 32-in. from K-1 to K-3. Testing and filling of this final 149-mile section will be completed in July. The use of the K-1 to K-3 section of the new line means that full capacity of the line will then be dependent only on finishing the new pump facilities later in the year.

Augmenting the work force to provide the second full spread called for the speedy purchase of considerable additional equipment. The speedup program required the hiring of 300-350 more men, and entailed the purchase of, among other items, 130 new units of transportation, 14 more tractors, and 8 more 25-bbl. tar pots.

Steel requirements.—The new line requires, altogether, 167,918 tons of steel pipe. Of this, 22,273 tons is 26-in. All the 26-in. and 96,122 tons of the 30 and 32-in. were shipped to and offloaded at Tripoli by lighters and then moved by rail to dumps and the denesting and jointing plant at Homs, Syria.

The remaining 49,523 tons of 30 and 32-in. were landed at Basra in southern Iraq and then moved by rail to Station K-2 near Baiji on the Tigris River. The denesting and jointing plant was scheduled to be moved to Baiji about the end of November. Pipe shipped to Basra will be laid from K-1 to K-3.

All the pipe to be landed at Tripoli has been received. The last of the Basra pipe cargoes was at sea by the end of October. The movement of the nearly 168,000 tons of pipe from the United States required a total of 34 ships—7 for the 26-in., 18 for the 30 and 32-in. to Tripoli, and 9 for the 30 and 32-in. to Basra.



OPERATIONS.—Antar truck, top, used in stringing 30 and 32-in. pipe. Below, Tigris River crossing preparatory to pulling the four 16-in. lines.

The 30 and 32-in., which was nested aboard ship to conserve shipping space, is a prestressed, longitudinally welded pipe in ⅜ and 7/16-in. wall thickness. The 26-in. is seamless pipe, ⅜-in. wall thickness.

Triple jointed.—After it was moved to the denesting and jointing plant, the pipe was triple joined into 93-ft. lengths. The stringer bead was applied manually. This was followed by a manual hot pass and two further cover passes which were automatic.

Diesel 250-hp. Antar trucks, built in Britain by Thornycroft, are being used for stringing. These vehicles haul nine 93-ft. lengths in one load. Care is being taken not to string ahead of the ditching in view of the blasting. Roughly 80 per cent of the ditching is in rock.

C.A.T. ditching.—All the ditching work on the line has been subcontracted to Arab Contracting & Trading Co. which is headed by Emile Bustani and has its main offices in Beirut, Lebanon. C.A.T., as the company is known, is the largest Arab contracting company in the Middle East and is being used widely by most oil companies operating in the region. It is building separator plants in Kuwait, houses in Iraq, tankage in Bahrein, and terminal facilities at Fao in southern Iraq, in addition to its work on the new I.P.C. pipe line.

I.P.C.'s 12 and 16-in. lines are both underground, and the same practice is being followed with the new project. The ditch for the 30 and 32-in. is 48 in. wide and 60 in. deep. On the bottom is a ¼-in. screened padding. The ditch is 15 ft. or more from the 16-in. line. The company had 30 m. of right-of-way but the new line necessitated taking an additional 15 to 30 m. through cultivated areas.

Laying practices.—An automatic internal lineup clamp is being used, and line welding practices are conventional. The stringer bead is applied followed by a hot pass and cover pass. A Coody cinch bender is being employed.

The deck-loaded pipe showed some salt-water scale, and it has been found necessary to run one or two cleaning machines ahead of the cleaning and priming machine. In the double coating and double wrap mainly British materials are being used.

I.P.C.'s line is believed to be the only one of its size to have a total of 3/16-in. in the two coal-tar coats. The first 3/32-in. coat is followed by a fiberglass reinforcement. The second is followed by a Rukene ruberoid outer wrap. Backfill to 6 in. above the pipe is screened through 2-in. openings to avoid damage to the enamel.

Since 16-in. valves and checks are being used on the line, it was considered unwise to make water tests.

Testing of the line will be carried out when it is filled with oil. The entire line will require about 2,354,000 bbl. of crude for filling.

River crossings.—River crossings also are being done by Bechtel. The Tigris and Euphrates crossings each consist of four 16-in. submarine lines. The approximately 500-ft. Tigris crossing has been completed, and the lines across the Euphrates, which is about 1,400 ft. in width, were to be finished by early November. The 26-in. pipe crossing the Orontes River is supported on a span erected by I.P.C. Direct width of this crossing is 103 ft.

Labor force.—Bechtel has more than 50 United States and 200 British staff members on its force. There are approximately 2,500 nationals on the direct payroll, and about the same number are employed by the subcontractors, principally C.A.T. Bechtel's extensive base camp at Homs includes quarters, workshops, warehouses, and other facilities. Even before the formation of the second full spread, about 500 pieces of equipment were in use. Portable frame houses from Sweden and supalite houses from Britain, each providing accommodation for four men, are the basic living quarters, both at the base camp and the line camps.

Bechtel has its main offices with I.P.C. in Tripoli. Arabian Bechtel's executive vice president is Clark Rankin, project engineer is H. F. Waste, and project manager, J. M. Leaver. The first spread is in charge of Roy Middleton, and the second under Joe James. For I.P.C. the resident engineer on the project is Frank O'Connor.

New pump stations.—I.P.C. is building completely new pump houses at Stations T-2 and T-4 and is making changes and additions at K-1 and K-3 to handle the additional requirements of the new line. The varying completion dates of these pumping facilities account for the several scheduled increases in the line's throughput through the latter half of next year.

This four-station program presently under construction for the new line provides for pumping for the 30 and 32-in. at K-1, K-3, T-2, and T-4. At K-1, where the crude is received from the Kirkuk stabilization plants, the six 5-stage pumps are being replaced by six 6-stage pumps which will operate in parallel. K-3 is about 500 ft. lower in elevation than K-1. Station K-2 is not now in use.

Present equipment at K-3 consists of six 6-stage pumps. K-3 power for the electric pump motors is provided by three Crossley-Premier 16-cylinder diesels coupled to individual generators. When the 30 and 32-in. goes into operation, the plan is to use three of the old pumps for the 12 and 16-in. with two in series to give 1,000 psi. line pressure. The other three will be replaced by five new pumps, three or four to operate in parallel to provide 729 psi. in the new line.

July completion slated. — The new pumping facilities at T-2 are scheduled to be completed by next July. Four new six-stage pumps are to be installed. The engines and generators are in an L-shaped building separated from the pump houses. Diesel engines, each developing 2,000 hp., drive the four generators.

The facilities at T-4 are similar except that only three six-stage pumps are being installed. Construction of this station is about 6 months behind that at T-2. Pending its completion and after the new line goes into operation, a temporary setup of 10 diesel-driven slush pumps will be used.

Slugging.—An interesting feature of I.P.C.'s pipe-line operation is the slugging of station fuel down the old 12-in. line. In December of last year, a 6,450-bbl. daily capacity topping unit was completed by Foster Wheeler for I.P.C. at K-3. The gas-oil production from the unit is slugged into the line and taken off at the stations for engine fuel. Since crude oil was used previously as fuel, the change is adding substantially to running time.

Banias terminal.—The new Banias terminal is being built on a tract of about 1,200 acres. It will be the third Mediterranean tanker terminal at present in use, after the Tripoli outlet for I.P.C.'s 12 and 16-in. and the Sidon, Lebanon, terminal of Tapline. Banias is about 60 miles north of Tripoli.

Construction at Banias started in June of last year, and the present program calls for completing 12 of the 23 tanks and the delivery and loading lines by December. The terminal will thus be ready to operate initially by gravity loading while work goes ahead on the terminal pumping equipment.

The terminal will provide six sea lines varying from 4,400 to 7,235 ft. in length. They extend out to 60 ft. of water depth and are spaced half a mile apart. All are 24-in., with ½-in. wall thickness and a weight of 125 lb./ft.

Sea lines. — The sea lines were launched from a single launching strip and floated into position. The 24-in. pipe floated with about 10 in. freeboard and no additional floating arrangements were used. The conventional dolly method was used to launch the lines. Once clear of the shore, they were towed out to a suitable distance of usually 3 or 4 miles and then maneuvered into position along a line of buoys.

Four of the lines had been laid as from mid-October, and the remaining two are to be completed before the end of the year. A gravity loading rate of 700 to 1,200 tons per hour per berth is anticipated. When the pumps are installed, the loading rate is expected to be from 2,200 to 3,000 tons per hour.

Tankage.—The 23 tanks being built are 164 by 56 ft. and have a gross capacity of 200,000 bbl. each. Effective capacity is 180,000 bbl., giving a total effective capacity of the tank farm of 4,140,000 bbl. From the 26-in. main line, a 24-in. ring-filling line runs through the tank area. Three 24-in. lines lead from the tank farm manifold to the first three sea lines, and three 32-in. to the remaining three sea lines.

Erection of the tankage was contracted to Motherwell Bridge Contracting & Trading Co., Ltd., a joint company organized about 18 months ago by Motherwell Bridge & Engineering Co., Ltd., and C.A.T. At Banias, I.P.C. also is building two stone breakwaters, one 2,050 ft. and the other 850 ft. to provide a boat harbor. Eighteen feet of water will be available.

Bank Officials in Iran

Two representatives of the International Bank for Reconstruction and Development are now in Iran for an on-the-ground investigation of the possibility of a resumption of oil operations with bank assistance.

The two are Torkild Rieber, president of Barber Oil Corp., New York, who is acting as expert oil consultant to the bank, and Hector Prudhomme, the bank's loan officer. Their program called for spending several days each in Abadan and Teheran before returning to Washington.

Just how the world bank expects to work out a settlement was obscure.

In Teheran, Prudhomme said the price demanded by the Iranians for oil sales is the biggest obstacle to an agreement.

The bank's proposal provides for setting up a temporary oil-industry management staff which would handle the operations. Its members would be neither Iranian or British.

Zubair Crude Set at $1.67

Socony-Vacuum Oil Co., Inc., has announced a price of $1.67 for crude oil from Basra Petroleum Co., Ltd.'s Zubair field, f.o.b. the terminal at Fao, Iraq, on the Shatt-el-Arab River.

The Zubair price is in line with the prevailing price in the Persian Gulf which is $1.75 for 36°-gravity crude. Zubair crude is 32°-32.9° gravity, thus reflecting the 2-cents differential per degree of gravity. Zubair began commercial production only about a month ago.

Of the seven companies interested in Middle East production, Socony-Vacuum is the only one which publicly posts the price at which the crude is sold.

"You may have to stand outside!"

REMEMBER Aesop's fable of the camel and his master--how the kind master allowed the shivering beast to put into the tent first his head, next his shoulders, then his forelegs!

And then the camel said, "Master, I think I ought to come wholly inside," and crowded in. Immediately he said, "There is hardly room for us both, so I think it would be better for you to stand outside so I can turn around and lie down." And without further ado, the camel kicked the man out and took the entire tent.

Men have heard this story for 2,500 years--repeatedly have seen how it illustrates what happens when one man or group of men gain power over others. Men saw it happen in Italy and Germany when Mussolini and Hitler took over. Men saw it happen in Russia.

Even here in America a similar trend is evident. Powerful influences overlook no opportunity, through political manipulation, central controls and bureaucratic regulations, to intrude more and more in our private lives. The situation demands continual, alert watchfulness by all citizens who believe in individual liberty and freedom, to prevent this camel of big government from creeping further into the tent. Before we realize it, "we, the people," the master, may find ourselves "standing outside." In America it is government, which is the servant of the people.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio

Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.

New Oil Sources

Stratigraphic traps may provide new Middle East reserves, Baker says; prospects in France are considered promising

PHILADELPHIA. — Stratigraphic-trap type accumulations hold the possibility of opening up entirely new sources of oil in the Middle East, N. E. Baker, chief geologist of Iraq Petroleum Co., Ltd., said here December 28 during a meeting on foreign petroleum geology sponsored jointly by the American Association for the Advancement of Science and the Geological Society of America.

Baker, who is recognized as one of the top authorities on the geology of the Middle East, remarked that all commercial oil pools so far discovered in the region occur in anticlinal traps, but that the possible existence of other types of accumulation, namely stratigraphic, could not be excluded because no systematic search for them has been made to date.

The task remains, he said, to ferret out stratigraphic traps which are bound to exist in view of the vast changes in deposition in the area. As much, if not more oil, is probably yet to be discovered in the Middle East.

The basic geological characteristics of the Middle East and the geological background for the prolific reservoirs found in the Persian Gulf geosyncline were reviewed by Baker in the paper which he coauthored with Dr. F. R. S. Henson, senior research geologist of I.P.C. While no individual fields were discussed, in reply to a question, Baker said that I.P.C. had investigated the oil prospects of Palestine, now Israel, for a number of years and that the results were quite discouraging, though the program was never completed.

Opinions differ.—Baker pointed out that opinions differ on the extent of indigenous versus migrated oil in the Middle East. In some fields there are strong indications that oil has migrated vertically, via fractures, through considerable thickness of rock, to be accumulated finally in porous or broken limestones beneath the first plastic, infrangible cover.

This view is that, given original petroliferous conditions somewhere in the section, the present occurrence of commercial oil pools depends mainly on the disposition of plastic cover; and that the reservoirs in the orogenetic belt— the region of tangential compression from the north, northeast, and east, and now marked respectively by the Taurus, Zagros, and Oman mountain ranges—may contain mixtures of oil from several sources.

On the other hand, some authorities discount vertical or lateral migration, pointing to the adequacy of associated source and reservoir conditions at many horizons in the Zagros sections. One interesting example in southwestern Iran is where Eocene marlstones serve as a seal between distinct Tertiary and Cretaceous reservoirs in one and the same structure.

Results not satisfying.—"Dry holes have been drilled in geologically favorable locations, but the easy explanation that oil was never formed in the vicinity is not always satisfying if the face of abundant, residual oil traces," Baker said. "It is possible that success or failure depends sometimes upon the coincidence of late anticlinal traps and original accumulations under stratigraphic and/or preorogenetic structural controls.

"If this is true, then good results may be obtained from a stratigraphic approach to oil finding, involving studies of basinal morphology, sedimentation, and tectonics in relation to the areal distribution and migration of oil, and offering prospects for the discovery of surviving stratigraphic types of accumulation."

The Baker-Henson paper on the Middle East was one of a number of separate discussions devoted mainly to petroleum developments and geology in various countries. The program for the all-day meeting was arranged by A. W. Weeks, staff geologist of Sun Oil Co. Highlights of some of the other papers follow:

Mexico.—Several recent discoveries of Petroleos Mexicanos and their regional geological interpretations were described by Manuel Alvarez, Jr., of the Mexican oil agency, in a paper read by John F. Mason, Atlantic Refining Co. geologist. One of the most important of these new fields is Jose Colomo in Tabasco which has a probable area of 9,000 acres with sands aggregating 650 ft. thickness.

The structure, a symetric anticline with a 5-mile east-west axis, was discovered by reflection survey. Width is 3.3 miles, and closure is on the order of 900 ft. The discovery, made April 21, was completed from a 66-ft. sand of the Lower Amate (Lower Miocene) at 5,166-5,233 ft. Initial potential was 1,170 bbl. and 1,065,350 cu. ft. of gas daily through a ½-in. choke. The discovery opens up great possibilities at least for prospects on a belt parallel to the west margin of the basin and in the vicinity of the Medellin high, especially its north and east flanks if not the whole basin.

France.—Exploration in France during the last 2 years has shown extreme promise, according to Dr. J. Dupouy-Camet, of Cie. Francaise des Petroles, Paris, whose paper on French developments was read by L. W. Weeks, research geologist of Standard Oil Co. (N.J.). The most outstanding event has been the development of Lacq field, now the most important in metropolitan France and its overseas territories.

A total of 40 rigs are operating in France, one-half having a drilling capacity of more than 8,000 ft. During 1950 and 1951, a beginning was made in the study of unexplored, or partially explored, sedimentary basins, including Alsace Valley, the Saone River Valley, and Jura, Savoie, and Provence, the Paris basin where geological work has started, the lower Rhone River Valley (Camargue), and the northern part of the Aquitaine basin where 4,356,000 acres have been granted in concession to Standard Francaise des Petroles.

The hopes held for important oil reserves following the 1949 Soultz-sous-Foret discovery in the Pechelbronn area did not materialize, Dr. Dupouy-Camet reported. Oil accumulation is small, and the production changes rapidly to salt water.

Australia.—The failure to find commercial oil production in Australia, an area as large as the United States, despite half a century of exploration, is due primarily to unfavorable geological factors, especially the scarcity of large sedimentary basins with a fair thickness of unmetamorphosed marine sedimentary strata, Frank Reeves, now consultant to the Petroleum Administration for Defense who has done field studies in Australia, reported.

As have other students of Australian geology, Reeves held the best prospects for petroleum are in the three basins in Western Australia. Even though the prospects are of low rank, they warrant further exploration. The Northwest Basin—where the Caltex-Ampol company plans to drill in the near future—is the most attractive, Reeves said. The section includes 1,100 ft. of Tertiary marine sediments, 700 to 1,000 ft. of Cretaceous, 8,000 ft. of Permian, 2,500 ft. of Carboniferous, and 5,000 ft. of Devonian.

Japan.—This area also has scant prospects for the future development of large supplies of oil. This conclusion, the light of existing knowledge, was made in a paper prepared by L. W. Stephenson, United States Geological Survey, from material supplied by C. M. Pollock, retired Shell geologist who was associated with the postwar Japanese petroleum development.

In the Japanese geosyncline where there are some 5,500 ft. of sediments from mid-Miocene to Pliocene, all the more promising known structures have been drilled. Most important of the 55 small fields is Yabase.

The Tokyo Basin with about 30,000

ft. of sediments offers possible sources of petroleum. The Hokkaido geosyncline, where several small fields of low porosity have been developed, cannot be written off until the Cretaceous has been explored. These strata may be less severely compressed by folding. The single deeper test drilled to date went to 7,500 ft. before it was abandoned in 1949.

Pricing pattern.—Despite the growing importance of the Middle East, it is unlikely that international petroleum prices will break away and become independent of their present United States Gulf Coast basis. The evidence to support this prediction lies in the fact that United States companies control more than 70 per cent of world reserves and that Middle East oil will probably be imported into the United States in increasing quantities and at prices based on the United States Gulf quotations.

This view was advanced in a paper presented by Sherman R. Abrahamson economic geographer with the petroleum and natural-gas branch of the U. S. Bureau of Mines. His discussion was only one which deviated from the strictly technical geological theme of the meeting.

Abrahamson, to emphasize the shift in the geographical center of world oil production, statistically computed that the true center of world production in 1929 was within the United States, but that in 1950, because of the output of the Middle East, it had moved nearly 1,000 miles northeast.

If the companies controlling the Middle East reserves did not have strong interests in North America, a major revision in international oil prices could be expected in view of the high potential and low production costs of oil in the Middle East. On the other hand, it is self-evident Abrahamson said, that since United States companies control the greater part of world reserves, there is no incentive to dump great quantities of Middle East crude on the international market, forcing Western Hemisphere oil out of these markets and probably causing restrictive quotas or high duties in North America.

Stations Near Completion

Arabian American Oil Co. expects to complete construction early in 1952 of two additional separator stations in Qatif field in its concession in eastern Saudi Arabia.

Qatif, discovered in 1945, is located on the coast between Dammam and Ras Tanura. At Qatif is a main junction point in Aramco's pipe-line system with the 30-31-in. leading northwest to the Mediterranean and other lines extending northeast to the Ras Tanura refinery.

The field has been producing about 20,000 bbl. daily and handling the oil in the single existing separator station. Completion of the two additional stations will give a total separator capacity of about 50,000 bbl. daily and will allow production to be increased to approximately this level.

EUROPE

Catalyst Plant Under Way

A Dutch chemical company, Koninklijke Zwavelzuurfabrieken (Ketjen) is building continental Europe's first plant for the manufacture of synthetic fluid cracking catalysts at Amsterdam.

The company will manufacture miscrospheroidal catalysts using American Cyanamid Co.'s patents and processes under contract. Production of the catalysts will begin early in 1953 and will be sufficient to handle an annual refining capacity of more than 56,000,000 bbl.

Contracts for all the production for the first 10 years have already been made with Royal Dutch-Shell and the Standard Oil Co. (N. J.) organization for refineries in France, Belgium, and Germany, according to Amsterdam reports. The annual 5,000 to 6,000-ton production of catalyst can be increased later to 10,000 tons if necessary.

ASIA

Caltex Steps Up Activity

Refining and exploration, activities of California Texas Oil Co., Ltd., in eastern Asia are being stepped up in response to the increasing needs of the markets in that area.

Crude from Minas field in Central Sumatra is expected to enter world markets the second quarter of next year. R. G. Follis, chairman of the board of Standard Oil Co. of California, which, with The Texas Co., owns Caltex, said operations at Minas have indicated large reserves. Reports in the industry are that this field is one of the most important discovered in recent years.

Follis disclosed that Caltex has an 80 per cent interest in West Australian Petroleum, Ltd., which will soon start drilling in the Northwest Cape region of Western Australia. Remaining interest in the new company is held by Ampol Petroleum, Ltd., an Australian company.

Caltex is preparing to build a 22,000-bbl. daily refinery near Sydney, Australia, and a 12,000-bbl. plant near Manila in the Philippines. Both will have catalytic cracking. Caltex has 50 per cent interest in Nippon Petroleum Refining Co., Ltd., and Koa Oil Co., Ltd., in Japan. The three Japanese refineries of these companies are to be modernized and expanded to a total of about 30,000 bbl. daily.

Indonesia Oil Exports

Petroleum exports from Indonesia during the first 10 months of this year were at a rate slightly in excess of prewar shipments, according to data of the Office of the Indonesian Trade Commissioner in New York.

During the January-September period, exports of crude oil and products amounted to 4,491,176 metric tons, or about 16,500 tons daily (approximately 115,000 bbl. daily). The annual average exports during the period 1936-41 were about 16,400 tons daily.

During September, Indonesian petroleum exports totaled 326,052 tons valued at 33,059,000 rupees. This gives a per barrel value of about $3.76 at the official rate. Most of the Indonesian exports are in the form of refined products, including aviation gasoline from the plants in South Sumatra.

During the first 10 months of the year, Indonesia imported a total of 748,341 tons of petroleum. This is equivalent to 2,740 tons a day or about 19,200 bbl. daily. Current Indonesian production is about 155,000 bbl. daily.

International Briefs

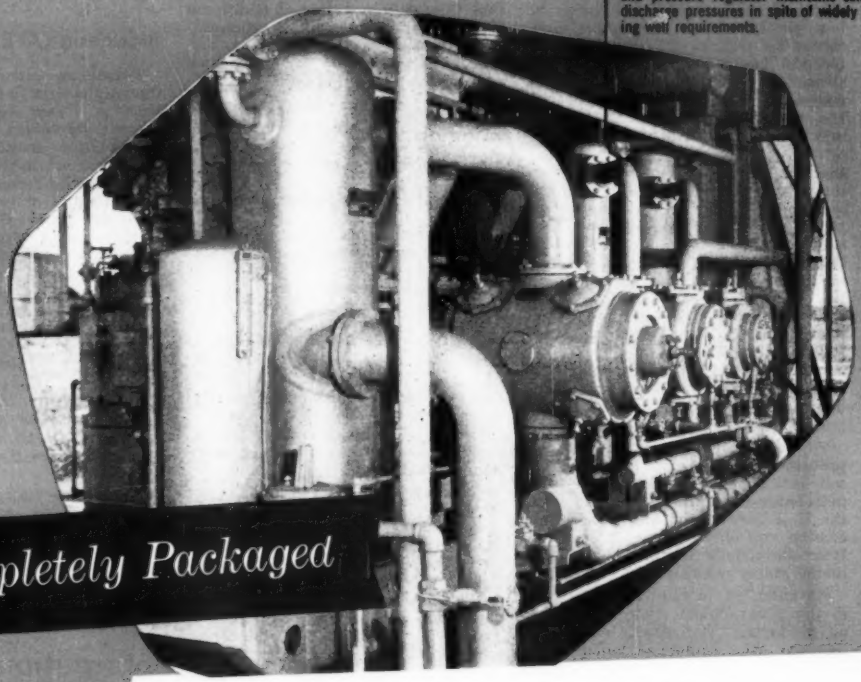
Arabian American Oil Co. has completed a 40-mile, 4-in. products line from its refinery at Ras Tanura to Dhahran in Saudi Arabia, which serves principally requirements of the United States Air Force base at Dhahran airport. It also supplies a new bulk plant which Aramco has built at Dhahran for local sales. The Ras Tanura refinery, running about 170,000 bbl. daily, produces a line of primary products but not aviation gasoline.

The Chamber of Deputies of the Peruvian Congress has approved the government-backed petroleum law which would remove restrictions now existing on private exploration and development. The measure still must be approved in the senate. It was bitterly opposed in the lower house by left-wing groups who contended the country's petroleum should be nationalized.

Assam Oil Co., Ltd., Burmah Oil Co., Ltd., subsidiary, has made location for a wildcat about 1¾ miles north of Nahorkatiya Station 13 miles south of Tinsukia in the northeast corner of the State of Assam in India's Brahmaputra Valley. The well will be spudded early this year and is scheduled to go to 15,000 ft. if necessary. Assam Oil's Nichuguard test in the Naga Hills of Assam was recently reported below 3,697 ft. without showing production.

3-STAGE 330 H.P. 6 SVG

This packaged plant compresses flare gas f
a gas lift system in a South Texas oil fiel
The 4-cycle engine with automatic spe
and pressure regulator maintains consta
discharge pressures in spite of widely var
ing well requirements.



Completely Packaged

Custom Engineered

BEAIRD-INGERSOLL-RAND PACKAGED COMPRESSOR PLANT

Every component regularly found in a large permanent compressor installation is built into the Beaird-Ingersoll-Rand packaged compressor plant. The unit is completely assembled in the factory for shipment to the location.

For each installation the gas scrubbers, manifolds, piping and cooling system are custom designed by Beaird process engineers.

MANUFACTURED IN SIZES FROM 110 H.P. TO 440 H.P. FOR USE IN GAS LIFT, FIELD GAS GATHERING, FLARE GAS COLLECTION AND REPRESSURING.

THE J. B. BEAIRD COMPANY, INC. SHREVEPORT, LOUISIANA

BEAIRD
SHREVEPORT

PACKAGED COMPRESSOR PLANTS

L.P.G. SYSTEMS

CAST STEEL FITTINGS

ANHYDROUS AMMONIA EQUIPMENT

PRESSURE BULK STORAGE

MACHINING
FABRICATING
STEEL WAREHOUSE

PERSONALS

© Bachrach

Pipe-Line Head

Stevenson became gas man via the financial route

PRESIDENT of Texas Gas Transmission Corp. and a leading figure in the company since its formation is W. T. Stevenson.

Born in Leavenworth, Kans., Stevenson graduated from University of Kansas in 1923. He began his career in the natural-gas industry in 1926 when he joined the Kansas City office of Arthur Anderson & Co., public accountants specializing in gas utilities.

In 1928 he was assigned to do work for the predecessor companies of Kentucky Natural Gas Corp. The next year he accepted a position with these companies as assistant treasurer and director, and a year later moved to Owensboro, Ky., to organize an office for Kentucky Natural, and to incorporate into the new company the properties of Wood Oil Co.

He held the office of assistant treasurer of Kentucky Natural from 1933 until 1942, when he was named vice president and treasurer. During the same year he also became president of Western Kentucky Gas Co., then a subsidiary of Kentucky Natural.

In 1945 he was made vice president and director of Memphis Natural Gas Co. and vice president, treasurer, and director of Texas Gas when it was organized in 1945 as a holding company. When in 1948 Texas Gas became an operating company through merger of Memphis Natural Gas Co. and Kentucky Natural he was named executive vice president. He was elected president last May.

E. A. Smith, former superintendent of the Petrolia, Ont., refinery of Canadian Oil Cos., Inc., will be transferred to the head office in Toronto, Ont., to direct the company's manufacturing activities. **Vincent Norwood,** present superintendent at Petrolia, will become plant manager at the new Froomfield refinery, and **Dr. Kenneth West** will be production superintendent. The Froomfield refinery is expected to start operations by April.

Carl L. Bryan, formerly chief geophysicist and exploration geologist for Gulf Refining Co., has opened consulting geophysicist-geologist offices at Shreveport.

Afton M. McConnell, tool pusher for Richardson & Stewart Drilling Co., has been transferred from Freer to Three Rivers, Tex.

Daniel E. Fitzgerald, formerly roustabout for Ohio Oil Co., has been transferred from Eureka, Kans., to Wolco, Okla., as assistant foreman.

Roy H. Smith has been named chief production engineer of Stanolind Oil & Gas Co., replacing **Lewis Finch, Jr.,** who became chief engineer, producing department. Smith has been with the firm since 1934, immediately after receiving his B.S. degree in petroleum engineering from the University of Tulsa.

Clarence E. Rabb, assistant foreman in Magnolia Petroleum Co.'s Shreveport producing district, has been promoted to production foreman and transferred to the company's Brownfield producing district in West Texas. **Ralph M. Cummins,** formerly assistant foreman in the Kermit, Tex., producing district, has been made production foreman in that district.

John W. Adams has resigned his position with Fullerton Oil Co. to become vice president of Shannon Oil Co., recently organized by a group of Hobbs, N. M., oil producers to operate in New Mexico, Texas, and Oklahoma. **Val Ryan,** formerly with Drilling & Exploration Co. at Hobbs, has succeeded Adams with Fullerton.

Dr. Floyd L. Miller, director of research for Standard Oil Development Co., has been appointed vice chairman of the research and development board, an advisory agency of the defense department, where he will oversee the activities of committees dealing with biological and chemical warfare, fuel and lubricants, equipment and materials, human resources, and medical sciences and ordnance. He succeeds **Dr. Robert C. Gunness,** who has returned to his position as assistant general manager of manufacturing for Standard Oil Co. (Ind.).

C. J. Zabeik, formerly foreman for Shamrock Oil & Gas Co., Sunray, Tex., has joined Western Co. at Seagraves, Tex., as design engineer.

Harold N. Pardee, independent oil producer of Los Angeles, has been named a petroleum consultant for the International Correspondence Schools, Scranton, Pa.

O. D. Chase, formerly drilling superintendent with Fowler Drilling Co., Long Beach, Calif., has joined Macmillan Petroleum Corp. as superintendent of drilling and production.

J. T. DOYLE

John T. Doyle has been appointed manager of the natural-gas and gasoline division for Shell Oil Co. in Los Angeles. He succeeds **R. S. Tulin** who has been selected for special assignment by Shell's New York head office. Tulin continues his headquarters in Los Angeles but will spend full time on special natural-gas and gasoline problems affecting the company's United States and Canadian operations. Doyle was graduated from the University of Maryland in June 1933 and joined Shell the following month as a roustabout. After various promotions he was named assistant manager of the natural-gas and gasoline division in 1947 and has served in that position until his recent promotion.

Carl J. Senger has been appointed director of internal control for Warren Petroleum Corp. This is a new position to handle the problems of organization, procedure, and management.

Robert N. Williams, consulting geologist of Santa Barbara, Calif., has been appointed chief geologist for Coronet Oil Co. He will make his headquarters in Midland, Tex.

A. Gordon Cowan, exploitation engineer trainee for Shell Oil Co. at Long Beach, Calif., has been transferred to Glendive, Mont., and promoted to exploitation engineer.

Walter M. Lenamon, formerly with Baroid Sales Division, has joined Magnolia Petroleum Co. at Lake Charles, La., as petroleum engineer.

J. E. Johnson, supervisor of the material and supply department of Tide Water Associated Oil Co., Tulsa, has been appointed purchasing agent for the firm's Mid-Continent divi-

PERSONALS

sion. Johnson, who has been with the firm 27 years, succeeds the late M. F. Bridges.

Gilbert H. Blankenship, formerly geologist with Pure Oil Co., has joined Cameron Oil Co. in Midland, Tex., in the same capacity. He will fill the place formerly held by **Jack Elam,** who left the firm to become an independent operator in Midland.

J. P. BLACK

J. P. Black has been named assistant to the president of American Republics Corp., Houston. He will supervise the geophysical work of the firm and all matters pertaining to Republic Production Co., a wholly owned subsidiary of American Republics. Black has been with the firm since 1934. **Flavy Davis,** chief geologist, succeeds Black as manager of the exploration department. **Sam Sims** replaces Davis as chief geologist; and **Paul Orchard** has been named assistant chief geologist, a newly created position.

J. R. Lynch, formerly petroleum engineer for The California Co. at Hamilton, Colo., has joined Sunray Oil Corp. at Newhall, Calif., as production engineer.

Perry Isham, chief mechanic for Thomas P. Pike Drilling Co., Los Angeles, has been named superintendent of equipment maintenance. **Gerald Robertson, V. L. Parker,** and **Earl Pugh,** all former drillers, have been advanced to tool pushers.

S. E. White has been named division manager of production for Seaboard Oil Co. at Dallas, and **C. C. Matthews** has been appointed assistant to the division manager of production. In the Midland, Tex., offices, **H. J. Brady** has been made district engineer; and **Paul Ravesies** named assistant district engineer. **Robert Wallas** was named assistant district engineer at Corpus Christi, Tex.

Barney Dunlap, independent oil producer of El Dorado, Ark., has been elected president of the South Arkansas secondary-recovery study group. The group was formed in 1946 for persons interested in the study of oil and gas reservoirs, production problems, and secondary recovery of oil. Other officers elected include: **Ralph D. Curtis,** Murphy Corp., vice chairman, and **Paul Horton,** Arkansas Oil and Gas Commission, secretary.

P. W. Judah has been appointed manager of the lubricating department of Socony-Vacuum Oil Co., Inc.

John W. Stephenson, engineer trainee for Tide Water Associated Oil Co., at Hobbs, N. M., has been transferred to Odessa, Tex., as associate engineer.

Harold E. Reppen has been promoted to group leader in technical service at the Whiting, Ind., research laboratories of Standard Oil Co. (Ind.). Reppen joined the company in 1943 as a chemical engineer following graduation from the University of Illinois.

R. L. Boss has been transferred from Gulf Oil Corp.'s Roswell, N. M., office to Fort Worth, Tex., and promoted to assistant division geological supervisor. **L. E. Warren** has moved from Midland, Tex., to Fort Worth as assistant division geological supervisor. Other promotions and transfers include: **Y. B. Newman,** to zone geologist, New Mexico; **W. D. Blackmon,** to zone geologist, Amarillo; and **A. W. Dosier,** to zone geologist, Midland.

H. G. Kinzey, junior geologist for Shell Oil Co., has been transferred from Oregon to Sacramento, Calif., in the San Joaquin Valley division. Other recent transfers in Shell's exploration department include: **Wayne W. Morford, Jr.,** seismologist, from Sacramento to Oilfields, Calif.; **Lawrence Keith,** junior seismologist, from Oilfields to Bakersfield, Calif.; **Francis Lehner,** seismologist, from Ventura, Calif., to Bakersfield; and **J. R. Castano,** formerly a junior geologist at Houston, to Bakersfield as geologist.

Gene Graham, formerly assistant to the president of Rocky Mountain Drilling Co., Los Angeles, has been made vice president in charge of contracts for the drilling concern.

Tom C. Frick, an executive in the Midland, Tex., division of Atlantic Refining Co., has been promoted to head the new regional organization the firm is establishing at Corpus Christi. In his new job Frick will be regional-coordinating manager. The new office at Corpus Christi will handle the company's work in the territory formerly handled by the Corpus Christi and San Antonio districts. The San Antonio office will be discontinued.

French L. Smith, for 22 years general superintendent of Hope Producing Co. of Monroe, La., has been elected to the board of directors of Carter Oil Co. He has been with Hope and other affiliates of Standard Oil Co. (N. J.) for 33 years. Hope was acquired by Carter in 1947 and is a wholly owned subsidiary.

Al Brown, independent operator, has moved his offices from Kilgore, Tex., to Houston.

Johnston E. Holzman, geologist for Shell Oil Co., has been transferred from Atascadero to Ventura, Calif.

FORTY-YEAR SERVICE AWARD.—While his colleagues look on, Frank W. Abrams, chairman of the board of Standard Oil Co. (N. J.), presents a 40-year service button to Chester F. Smith, vice president and director, in the Jersey Standard board room. From left: J. O. Larson, assistant secretary; M. J. Rathbone, and L. W. Elliot, both directors; Abrams; J. E. Crane, vice president and director; Smith; E. E. Soubry, vice president and director; D. A. Shepard, and H. H. Hewetson, both directors. Smith was elected president of Esso Standard in 1940, director of Jersey Standard 4 years later, and vice president of the parent company in 1946.

PERSONALS

Harvey L. Hurley has joined Duke Petroleum Co., Ltd., at Calgary, Ont., as vice president and general manager. He was formerly assistant sales manager of W-K-M Co. of Houston.

©Bachrach

Andrew Neilson has been elected a vice president and director of California Texas Oil Co., Ltd. Neilson, who will continue as president of Overseas Tankship Corp., an affiliate of Caltex, has been directly connected with shipping activities for the past 23 years.

W. G. McCampbell, Jr., geologist for Humble Oil & Refining Co., has been transferred from Tallahassee, Fla., to Midland, Tex., in the same capacity.

Harry G. Keller, formerly chief of the traffic and rate section of Sinclair Refining Co., has been appointed traffic manager of the company.

Irving K. Peck, vice president and general manager of the Pittsburgh group companies of the Columbia Gas System, Inc., since 1946, has been appointed vice president of Columbia Gas System Service Corp. Peck will have the responsibility for procuring natural gas for the system from the Southwest. He will make his headquarters in Houston.

E. J. Boos, former district geologist, has been named staff geologist at Casper, Wyo., for Schio Petroleum Corp., and **Richard P. Swirczynski,** senior geologist, has been promoted to district geologist at the same place.

Arnold S. Bunte, exploration manager for Vickers Petroleum Co., Inc., has been transferred from Oklahoma City to Roswell, N. M., in the same capacity.

Raymond Reaber, formerly chemical engineering research assistant at the U. S. Army chemical center in Maryland, has joined Standard Oil Co. of California as job engineer at El Segundo, Calif.

J. B. Adoue, Jr., has been named president and director of Ajax Petroleum, Ltd., Canadian oil firm. He was with Humble Oil & Refining Co. 17 years when he was called upon by the government during World War II to build a pipe line from Portland, Me., to Montreal, and then was sent to Venezuela and other points to build pipe lines. After the war he opened consulting-engineering offices in New York and Toronto. He is also a director and chairman of the management committee of Ajax Alberta Pipe Line Co., Ltd.

E. L. Shafer, district superintendent of production for Continental Oil Co. at Hobbs, N. M., has been appointed manager of production for Hudson's Bay Oil & Gas Co., Ltd., Continental's affiliate in Canada. Shafer received his B.S. degree from the New Mexico School of Mines and joined Continental in 1937 as a roustabout.

J. A. Paroy, area superintendent for Sunray Oil Corp., has been transferred from Hebbronville, Tex., to Placedo, Tex., in the same capacity.

Robert W. Parks, junior petroleum engineer for Carter Oil Co., has been transferred from Oklahoma City to Great Bend, Kans.

William R. Stott, northern region sales manager of Esso Standard Oil Co., has been appointed assistant marketing coordinator of Standard Oil Co. (N. J.).

M. W. Wolf has been appointed division exploration superintendent of the newly created northwestern exploration division of The California Co. The office will be responsible for activities in Montana, North Dakota, South Dakota, and Minnesota. Headquarters for the new division will be announced later.

Robert L. Foree, Dallas independent producer, has taken over as director of the production division of the Petroleum Administration for Defense, succeeding **Richard G. Lawton,** who has returned to his position as president of Lawton Oil Co. at Magnolia, Ark. PAD also announced that **Col. W. J. Worcester,** formerly policy division chief of the Munitions Board Petroleum Division, has been assigned by the Air Force as aviation officer to act as liaison with the military, and coordinate aviation gasoline supply problems that may arise. **E. Carl Mattern,** of the Oil Workers International Union, who has been consultant to Deputy Administrator **Bruce K. Brown,** was advanced to the post of assistant deputy administrator.

DEATHS

John M. McMillan, 68, vice president and director of Cities Service Co., died in New York City December 27. He had been with the firm about 40 years and had supervised the company's financial affairs for many years.

F. A. Louy, former treasurer of Prairie Pipe Line Co., died at Ingram, Tex., December 24. He was a native of Ohio and in the early days was with Buckeye Pipe Line Co.

R. M. Dillard, general superintendent of Paloma, Calif., operations for Gulf Oil Corp., died at Bakersfield, Calif., December 26.

Linton H. Choate, pioneer West-Central Texas drilling contractor and oil producer, died recently at Cisco, Tex.

Thomas Best, 66, long-time employe at Mid-Continent Petroleum Corp.'s Tulsa refinery, died in Tulsa December 23. He joined the old Cosden Refining Co. 39 years ago and continued in the employ of its successor, Mid-Continent.

George A. Detrick, 61, retired treasurer of Southern California Gas Co., died in Los Angeles recently.

E. Ivor McCray, 51, Los Angeles oil man, died in Los Angeles December 2?.

Louis O. De Hart, 79, a foreman at Esso Standard Oil Co.'s Bayway refinery for 35 years, died December 26 at Elizabeth, N. J.

George A. LaFever, 60, pioneer oil developer and for 25 years president of Huntington-Signal Oil Co., died December 28 at Los Angeles.

Joseph F. Lawrence, 47, Baytown, Tex., oil man, died December 25.

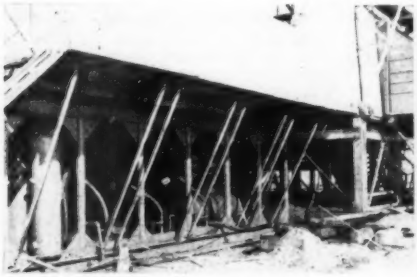
R. P. Smith, 68, president of Sabine Transportation & Towing Co., of Port Arthur, Tex., a subsidiary of Pure Oil Co., died recently in a plane crash near Kerrville, Tex.

Morris Stein, independent oil operator of Corpus Christi, Tex., and one of the early drillers in South Texas, died recently.

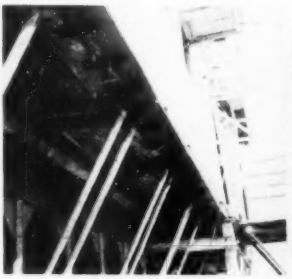
A. M. Johnson, 71, a pioneer of the Texas oil industry and retired vice president of Petroleum Iron Works, died December 24 at Houston.

J. J. Broadus and **M. Pickle, Jr.,** independent operators of Harlingen, Tex., were killed in a plane crash near Chicago December 21.

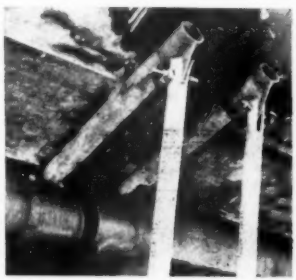
Jacob Foster Line, 60, former district oil gager for Mid-Continent Petroleum Corp., died in Tulsa January 2.



DUAL PURPOSE CATWALKS.—These catwalks on Rowan Drilling Co. rig in eastern New Mexico not only provide walkway for crew, but support engine-house wall. Note diagonal supports.



MADE IN SECTIONS.—View of edge of house section, above catwalks, made in sections to be laid in horizontal sills bolted to engine skid bases.



BOLTING ARRANGEMENT.—Close-up of horizontal sills with bolting fixtures to engine subbases. Catwalk is supported by braces keyed to gusset plates.

Handy Catwalks

They serve dual purpose as walkway, support for engine house on rigs used by Rowan Drilling Co. in New Mexico

CATWALKS lead a double life on Rowan Drilling Co., Inc.'s rigs in eastern New Mexico.

Not only do they provide walkways beside the drilling engines for men to pass from rig floor to engine house, but they serve as supports for the side walls of the engine house.

Sills for the walks are made of pipe having flat, rectangular heads welded at one end, containing holes for bolts to be inserted into plates attached to the skid members of the engines and adjacent equipment.

Each engine skid member is fitted with equipment to contain a pair of these sills. These have gusset plates at the outer ends as anchors, for the diagonal braces which support the free ends of the sills. Walks are made in sections of flat tank steel welded to angle iron running lengthwise. They fit on the short, stubby right-angle sills.

Anchors.—Anchors for the diagonal braces are welded to the drilling-engine substructure at the outer side of the bottom of the base. Triangular gusset plates contain holes through which pins are easily inserted when the diagonal braces are placed in position.

Diagonal pipe is split at each end to fit over the gusset plates and each brace is made the right length to support the outer side of the catwalk and prevent springing.

Wall sections.—The wall sections contain a narrow steel plate running the full length of the catwalk and form part of the treadway. These additional sections are supported by, and attached to, the main walk with short pieces of angle iron which are welded to the treadstock of the walk.

Studding for the walls is bolted to the walk at intervals and can be removed easily without tearing up the walks. Rigging up is simplified since each short stubby sill is identical with the other and holes bored through the rectangular plates match holes on all engine skid bases.

Gusset plates are attached in the same manner so that any diagonal brace will match.

Rowan Drilling Co., headed by A. H. Rowan, chairman of the board, and C. L. Rowan, president, is headquartered at Fort Worth. John Cuvelier is superintendent at Hobbs, N. M., with L. B. Mize and E. L. Heath, Jr., Jal, N. M., drilling superintendents.

LTX Units on Sunray Lease To Boost Profits on Wells

Six gas-condensate wells of Sunray Oil Corp. in South Sarepta field, Louisiana, are expected to yield nearly $80,000 per year in added revenue through use of six low-temperature-extraction (LTX) units.

Exactly how much additional condensate that will be recovered by an LTX unit depends on composition of the well stream, of course, but 10 bbl. of additional condensate for each 1,000,000 cu. ft. of gas produced is not uncommon. In South Sarepta field, tests proved an increase of from 10 to 14 lb. of condensate recovery for each 1,000,000 cu. ft. of gas produced.

An average well in South Sarepta field ordinarily produces more than 1,000,000 cu. ft. of gas daily. Thus in a year each well equipped with an LTX unit will yield about 5,000 bbl. more than a similar well with conventional separation. At the current price for condensate, this represents $13,250 per year additional income from one well.

Another feature of LTX units is that they not only recover additional hydrocarbons, but remove most of the water vapor from the gas, permitting it to be sold without use of expensive dehydration equipment.

Novel Header Assembly Is Used for Oil-Water Systems

A novel header assembly *(see drawing)* has been developed by Kewanee Oil Co., operator of Mid-

HEADER ASSEMBLY.—Diagram of Kewanee Oil Co.'s header assembly used in Mid-Burbank Unit, Osage County, Oklahoma.

Burbank Unit, Osage County, Oklahoma, to facilitate operations and provide adequate protection against adverse weather.

The advantage of this header over the conventional horizontal header when space is a consideration is appreciable.

Compactness of the circumferential lines permits ease of access to meters and control valves, and coverage by weatherproofing housing.

Gas Experiment

Propane-air substitutes for natural gas in test

PORTABLE propane-air units can be used successfully to supply fuel at sufficient pressure over an extended period to relatively large localities while repairs or tie-ins are made to natural-gas lines.

Lone Star Gas Co., whose engineers conceived and constructed the only two portable propane-air units known to be in operation in the country, and report that, in a test at Killeen and Fort Hood, Tex., the units supplied the localities with sufficient fuel for more than 3 hours while flow of natural gas was completely shut off for a tie-in with a new line.

While several permanent units are used in the East as auxiliary boosters, and also to supply small-town plants, Lone Star is the first to utilize such a unit to avoid construction of a long, main-line bypass.

Defense area.—Killeen, home of Fort Hood, has been declared a defense area and the developers of a housing project had begun work on a program which will eventually add 1,600 meters to Lone Star's Killeen system. A 10-in. main line pipe, which intersected the property destined to become a residential area, was to be replaced by a new 10-in. line skirting the construction and tying with the old main line east of Fort Hood.

A main-line construction crew laid 3,000 ft. of new pipe and the problem was to make the necessary cuts and welds to tie in the new section without cutting off the supply of gas.

Ordinary methods.—Ordinarily a pipe-plugging machine isolates a short section of pipe where the work is to be done and a short bypass is constructed, or a block valve is closed and a bypass laid to divert the gas. Too, the supply of gas can be shut off entirely, leaving the system to operate on the storage in the line.

All of these methods were deemed inadvisable in this case, and the propane-air units, three 4,500-gal. propane trucks, five air compressors, and tools and equipment were brought to the scene near Killeen, put into operation, and performed successfully while crews tied in the new line.

"Basketball" in Chains Does Pipe-Cleaning Job

They're using oversized basketballs to clean out pipe lines in California.

Crews of Southern Counties Gas Co., working near Lost Hills, have been removing dirt, grit, and sand which accumulate on inner lining of gas-transmission lines. This operation is done from time to time as the need arises.

Various-sized rubber balls, covered with interconnected links of chain, are stuffed into the pipe line and forced under pressure through selected sections of the line. Usually the section cleaned is about 5 miles in length, although longer or shorter spans may be cleaned in the same manner.

After the "iron clad" ball was inserted in the line, workmen opened the pressure valve to force the ball through the line. A second opening had been previously prepared about 5 miles away. Progress of the ball could be followed at the second opening by the rattle of the chain against the pipe.

Pipe on Sled Behind Dike . . . .Goes Out to Sea

A STEEL sled was used recently by Pacific Pipeline Construction Co., Montebello, Calif., to put down a submarine pipe line under the Pacific ocean near Ventura, Calif., for use by Union Oil Co.

The 7,500-ft., 20-in. line was designed to run from the terminal to a point 4,450 ft. out in the Pacific, where tankers can discharge refined products and receive crude. The line carries crude from the storage tank to ships at the rate of 14,000 bbl. per hour, while an 8-in. line carries refined products from ship to storage tanks.

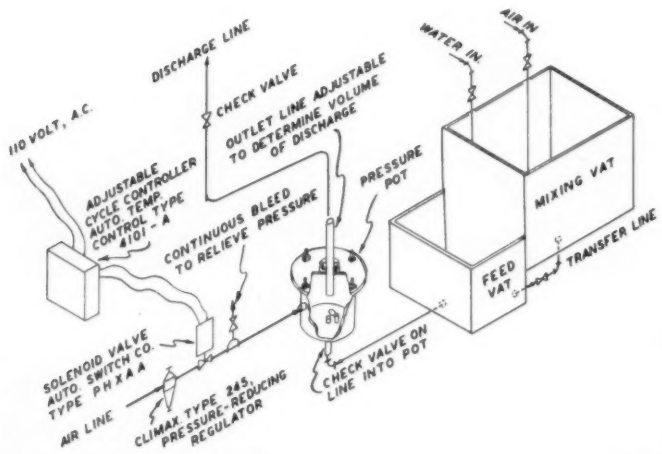
Bulldozers prepared the approach from the trolley ramp to the sea, and kept the dike prepared so that high tide would not flood the launching platforms.

The 20-in. line, weighing 185 lb. per lineal foot, was welded into 250-ft. sections and lifted on trolley way dollies by means of side-boom tractors. Two sections were placed on the dollies at one time and these sections then joined.

The first 500-ft. joined section was supported by the sled, to hold weight of the pipe as it slid along the ocean bottom, pulled by lines from a barge anchored about 1 mile offshore.

Succeeding 500-ft. sections were moved into position for welding to the preceding section, the entire pulling operation for the 20-ft. pipe taking 19 hours.

Operation was then repeated for the 8-in. pipe, which weighs 47 lb. per lineal foot. *(Photo courtesy Caterpillar Tractor Co.).*



GRAND PRIZE.—C. W. Miller's water-treatment controller, diagramed above, won top prize at the recent N.G.A.A. "Operating Kinks" session in Amarillo, Tex.

Automatic Feeder

Water-treatment controller developed by C. W. Miller of Midland Gasoline Co. wins top prize at N.G.A.A. meeting

AN automatic chemical feeder which is simple in construction, easily adjustable, and offers trouble-free operation, has been developed by Charles W. Miller, plant superintendent for Midland Gasoline Co. at Conroe, Tex.

Miller, who won the grand prize at the recent "Operating Kinks" session of the Natural Gasoline Association of America's Panhandle-Plains regional meeting in Amarillo, Tex., claims that use of the feeder for 6 years has proven its practicability in water-treating operations. Original cost is insignificant, Miller states, when considering the savings in man hours and chemicals.

How it works.—The treating system's mixing vat is sized for a week's supply of solution and calibrated so that solution concentrations are easily controlled. The solution may be mixed and tested while it is being charged from the feed vat. Air agitation insures thorough mixing *(see drawing)*.

Solution flows by gravity from the feed vat into the pressure pot. At selected intervals, air pressure forces the solution through the vat's discharge line into the water being treated.

The volume of solution discharged from the pressure pot may be varied by raising or lowering an outlet tube in the pressure pot.

Time-cycle controller. — At predetermined intervals the pot is air pressured for a selected time period. Air pressure is controlled by a pressure-reducing regulator. Continuous venting of air pressure enables the pressure pot to refill.

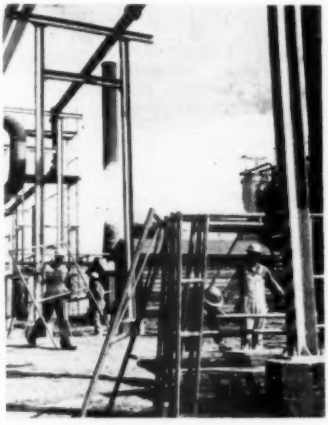
Radio Saves the Day at Esso's Bayway Refinery

While installing a new sewer at Esso Standard Oil Co.'s Bayway refinery at Linden, N. J., a telephone cable was accidentally cut disabling approximately 300 telephones for 12 hours, two-way radio telephones were put into operation immediately to handle vital interplant communications.

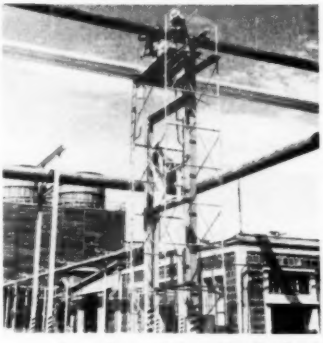
Under normal conditions, the radio system is used to keep constant contact between the central dispatch office of the transportation department and its rolling equipment.

The radio system's carefully blueprinted procedures, which were to be followed in the event of disaster or enemy action, were followed thoroughly. Immediately, radio-equipped vehicles proceeded to 19 key points in the refinery, and within 5 minutes of the mishap, messages were traveling the airwaves between posts and relayed to their destinations.

Here is how Esso's radio-telephone system works: An engineer, for instance, reports to a nearby post and requests contact with the central boiler house. This request is relayed to the central dispatch office, which relays the message, directing a radio-equipped car to summon the boiler-house engineer to the radio telephone. The boiler-house engineer reports to the post and announces himself to the central dispatcher, who directs cars to proceed with two-way radio communication.

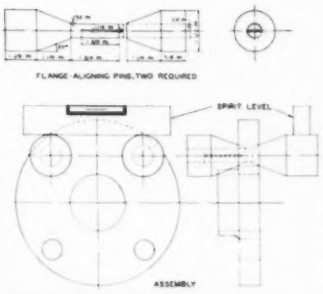


On the Ground . . .



. . . In the Air, Safely!

PORTABLE SCAFFOLD.—Maintenance men at Humble Oil & Refining Co.'s Baytown, Tex., refinery use this portable, prefabricated scaffold to reach high, inaccessible parts of the refinery to perform their tasks. Scaffold, shown in top photo dismantled is made of detachable metal sections and can be rapidly assembled (below) in minutes to allow crew to proceed with particular maintenance work.



RIGHT ON THE BUTTON.—Diagram showing how positive hole alignment on flanges can be obtained by new device.

Device Made for Positive Hole Alignment on Flanges

Positive bolt-hole alignment of standard-type flanges can be effected by a device developed by Kenneth T. Henson, welder foreman, and Oscar L. Watson, machinist for Shamrock Oil & Gas Corp. at the company's McKee plant at Sunray, Tex.

Pins are placed through two top holes of flange, and as the two parts are pushed snugly together, beveled edges bind against front and back of the flange. The pins are then brought to level as indicated in accompanying sketch.

The companion welding fitting is then connected to the flange with full assurance that it will be in alignment. This operation prevents the necessity of having to double-check alignment.

The device was given second prize in Class D at the "Operating Kinks" session of Natural Gasoline Association of America's Panhandle-Plains regional meeting in Amarillo, Tex.

Sohio Refineries Yield 30,500,000 Lb. of Scrap

Scrap, like oil, is where you find it, and Standard Oil Co. (Ohio) apparently knows what to look for in the right places.

The company reports that its five refineries, in a 2½-year period, have contributed more than 30,500,000 lb. of iron and steel scrap to the defense effort, in addition to 403,673 lb. of vital brass, lead, and copper.

The No. 1 refinery at Lima alone has accounted for 7,725,010 lb. of scrap steel, which is half again as much steel as was required to build the company's new catalytic cracking unit, or almost as much as will be used in the new $5,500,000 crude-distillation unit now under construction.

A total of 15 metal inspectors are employed for the five refineries. They constantly check condition of steel plates in storage tanks, pipes, and valves, and many other facilities.

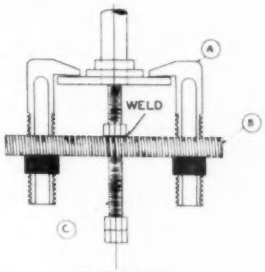
Unique Puller Removes Frozen Gears, Pulleys

When Tom Siefkes, mechanic for Shamrock Oil & Gas Corp. at the McKee Plants, Sunray, Tex., was confronted with a coupling on a pump shaft which he was unable to move with conventional pullers he constructed a puller to do the job *(see drawing)*.

In use the puller jaws are slipped over the coupling, the knurled nuts on the jaws being adjusted until the bar is parallel with the coupling. Pressure is applied by wrenching up the 6-in. center bolt against the center of the pump shaft until the frozen coupling (or gear) is removed.

With exception of the center bolt, the device is made entirely from discarded Stillson-type pipe wrench parts.

Siefkes' idea was awarded second prize in Class A at the "Operating Kinks" session of Panhandle-Plains regional meeting of Natural Gasoline Association of America, Amarillo, Tex.



GEAR PULLER

NOTE:
CONSTRUCTED FROM
'A' NO. 14 STILLSON PIPE WRENCH JAW
'B' NO. 36 STILLSON PIPE WRENCH JAW
'C' 1 2-IN. BOLT 6-IN. LONG & THREE HEX NUTS

Tire Changing Made Easy By Use of Hydraulic Press

The back-breaking work of removing truck tires from rims has been eliminated at Cities Service Refining Corp.'s Lake Charles refinery.

By constructing a shoe to fit a standard 60-ton hydraulic press, and welding channel irons together to support the tire, the tire-changing operation can now be accomplished in a few minutes without damage to the rim or tire.

When placed on the tire, the shoe gradually pivots as pressure is applied, thus preventing undue forces upon the tire wall, and follows the contour of the tire.

QUICK WORK.—This hydraulic press takes tire off rim quickly.

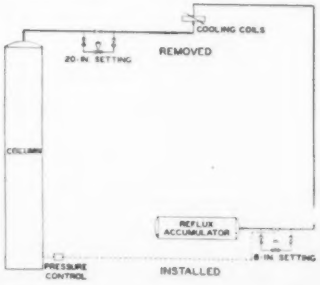
Back-Pressure Controller Increases Coil Efficiency

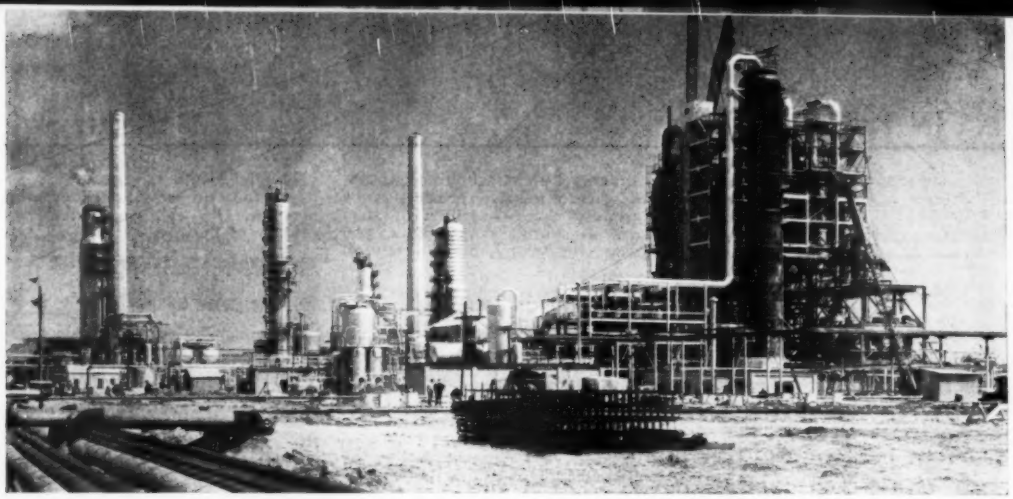
Through relocation of a back-pressure control by H. E. Sullenger, shift foreman for Phillips Petroleum Co. at Phillips, Tex., efficiency of overhead condenser was increased, and size of motor valve reduced *(see drawing)*.

The smaller motor valve and bypass replacing the original 20-in. controller resulted in 10 per cent more throttling efficiency in control on the condenser.

Since salvage value of the 20-in. bypass, motor valve, and other items amounts to $5,620, and cost of a new 8-in. installation is only $1,935, a savings of $3,685 is realized on each unit.

Sullenger's idea was awarded second prize in Class B at the "Operating Kinks" session of Natural Gasoline Association of America's Panhandle-Plains regional meeting in Amarillo, Tex.





Principal units of the Fawley refinery of the Esso Petroleum Co., Ltd.

Automatic Blending at Fawley Refinery

Four blending plants at this largest European refinery are designed to meet varying plant specifications, and to allow for future expansion

by George Weber
Refining Editor

THE new 126,000-bbl. per day refinery which Esso Petroleum Co., Ltd., recently placed on stream at Fawley, England, is now in full operation. Widely known as Europe's largest refinery, Fawley boasts numerous other distinctions.

An important feature from an operating standpoint is the modern design of transfer and tankage facilities which permits the continuous blending of all fuel products in the refinery. Four completely instrumented continuous blending systems designed by Standard Oil Development Co., produce finished products, minimizing and in some cases eliminating the need for intermediate or process tankage. Substantial investment savings were realized in carrying out this design, and further economies in operation are anticipated.

Fawley today comprises two crude-distillation units, a fluid catalytic cracking unit including light-ends recovery, a thermal reformer, an Edeleanu sulfur dioxide extraction plant, and two copper chloride naphtha-sweetening units. All of these processing units are now in full operation.

Under construction at present are a polymerization unit; a hydrodesulfurization plant for upgrading tractor fuel; and a lubricating-oil plant consisting of facilities for propane deasphalting, phenol extraction, propane dewaxing, and clay contacting.

The four blending plants operate in conjunction with the processing units now operating. One plant blends two grades of finished motor fuel, one blends diesel oils, one blends light fuel oil, and the fourth bunker fuel. They are designed for flexibility to meet varying product specifications and are sized to meet the requirements of expanded future operations at Fawley.

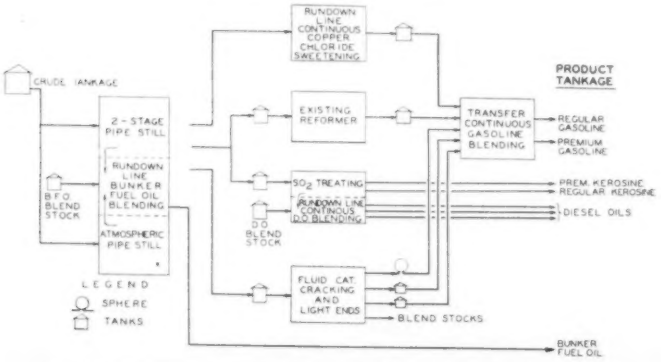
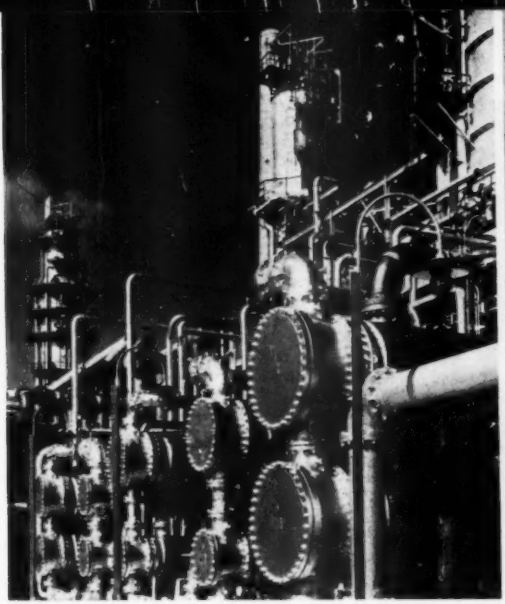


Fig. 1—Diagrammatic flow chart of the initial operations at Fawley refinery.

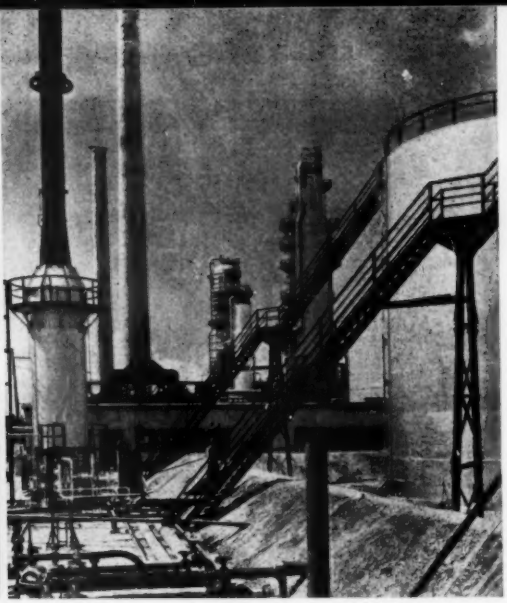
Over-all Operation

Fig. 1 illustrates schematically the current operation at the new refinery, including processing and blending steps required to produce the principal fuel products. Certain specialty products which require separate handling are not shown in the interest of simplicity.

The atmospheric and two-stage crude-distillation units fractionate crude into several streams generally classified under light distillate, heavy distillate, and residuum. Reduced crude and vacuum bottoms from the atmospheric pipe still and the two-stage crude unit are withdrawn directly to an on-site bunker-fuel-oil blending unit. There they are combined in desired proportions with a



Single-stage crude unit, left, and two-stage crude unit with heaters in foreground.

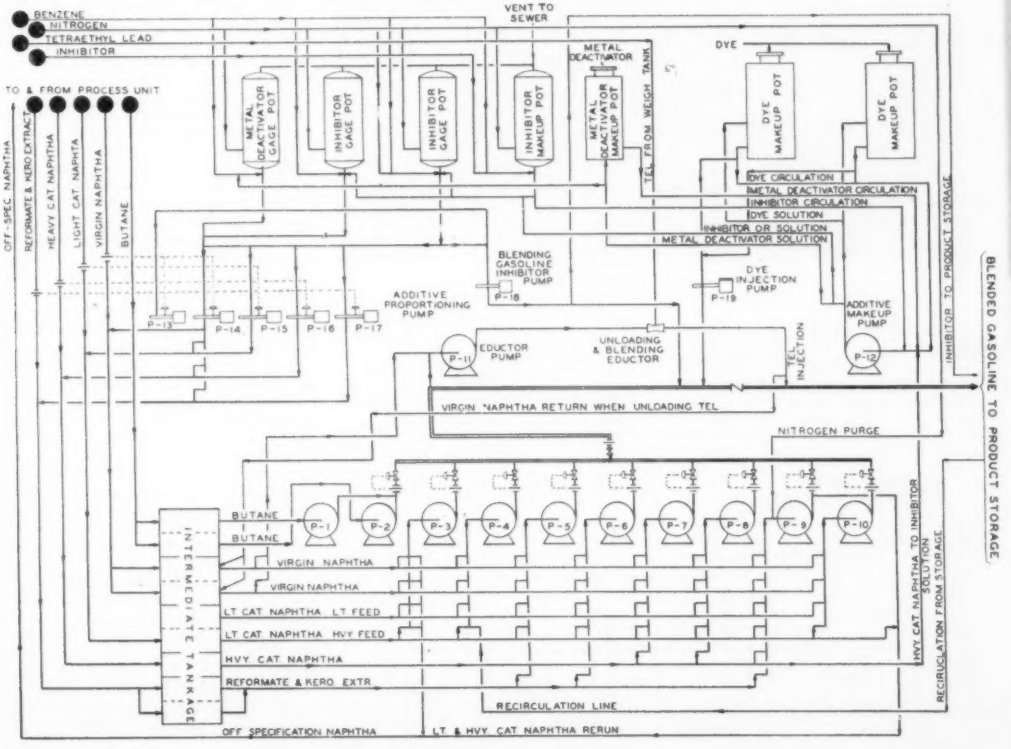


Fuel-oil heater of the boiler plant shown at left, with crude units in background.

catalytically cracked bunker-fuel-oil-blend stock to produce finished product. Refinery-fuel-oil requirements are first met with the excess blended as described above.

Middle distillates from the crude units and the catalytic cracker are combined with SO_2 extract in a continuous diesel oil blending unit oper-

GASOLINE BLENDING PLANT



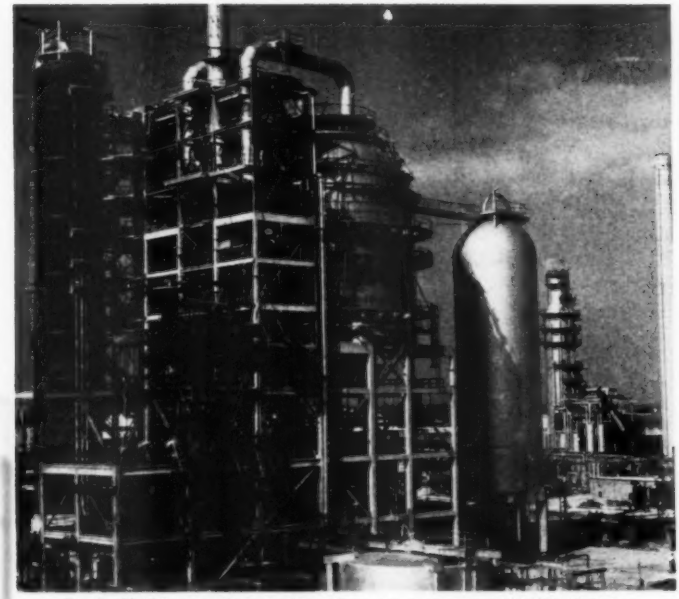


Fig. 2—Fluid-type catalytic cracking plant with a capacity of 33,000 bbl. daily.

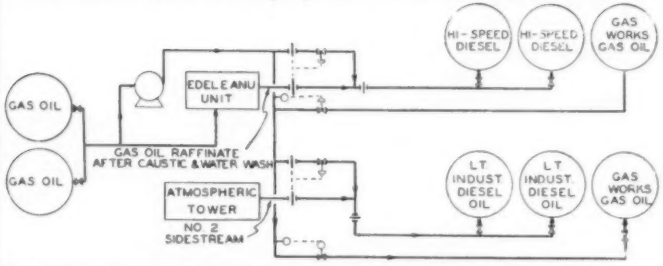


Fig. 3—Ratio flow-control valve blends untreated gas with total raffinate to specifications.

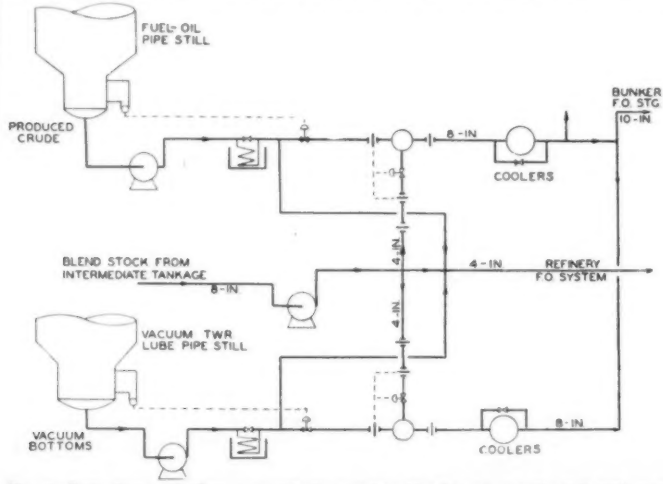


Fig. 4—Ratio flow controllers automatically regulate blending of gas-oil stock with each residual fraction.

ating in step with SO_2 extraction-unit area. Another section of this blending unit blends diesel oils from gas oil directly off the pipe still and diesel-oil blends stocks. The SO_2 raffinate and light straightrun gas oil are blended directly as they are withdrawn from the unit rundown lines while diesel-oil blend stock is provided from intermediate tankage.

Gasoline Blending

The gasoline-blending unit occupies a separate area. While it is not tied directly to rundown lines from the several process units, it takes suction from a relatively small battery of intermediate stock tanks. The unit combines a total of eight different hydrocarbon stocks to produce alternately, two grades of motor fuel. These stocks include: virgin naphtha, thermally cracked reformate, butane from the light-ends recovery unit, and four types of light and heavy naphthas from the fluid cat cracker operating on both light and heavy feed stocks. An additional stock, not shown in the over-all chart, is the aromatic-rich extract from the kerosine operation on the SO_2 extraction unit. These hydrocarbon components are continuously blended in selected proportions with gum inhibitor, metal deactivator, tetraethyl lead, and dyes to produce premium and regular grades of specification gasoline ready for product tankage.

The unit is designed to blend at about 41,000 bbl. of finished gasoline per day. Unit equipment design is based on operation for one 8-hour shift per day, 7 days a week at a 90 per cent service factor.

Design of this unique blending plant is outlined in the diagrammatic flow chart, Fig. 2. From rundown lines of their respective process units, the eight blending stocks are transferred directly to intermediate tankage in the blending area. Ten centrifugal blending pumps (P-1—P-10) including two spares take suction through separate lines from intermediate tankage.

The rate-of-flow controllers in each pump discharge line are adjusted for the desired flow rates of each component. Duplicate flow meters are provided upstream of each flow controller to permit a check on the functioning of the controllers and insure accurate proportioning.

All blending pumps discharge to a common 12-in. header for in-the-line blending en route to product storage. Into the common header are injected controlled amounts of tetraethyl lead and dye, and when necessary additional inhibitor.

The light-fuel-oil-blending equipment is in this same area. Inasmuch as it operates similar to the gasoline-blending unit (except for additives and TEL) it is not described separately.

Lead Blending

One weigh tank is provided for leading the motor gasoline and no

PETROLEUM CHEMICALS DIVISION
NEWS

January ★ One of a Series of Interest to the Petroleum Industry ★ 1952

Latest Du Pont Motor Gasoline Survey Due Week of January 21st

The January 1952 edition of Du Pont's Quarterly Motor Gasoline Survey—which reflects nationwide trends in gasoline octane numbers—will start arriving at refiners' offices on January 21. With this edition the survey begins its third full year of continuous publication.

With octane numbers frequently discussed by the press, and public awareness of gasoline quality running high, this issue of the survey is of particular interest.

Refiners have found the Du Pont Gasoline Survey of outstanding value in indicating competitive standings. Many use it also as a sales planning aid.

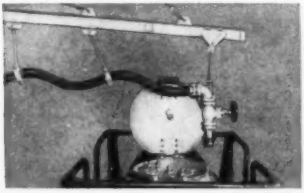
Du Pont-Designed Metal-Flex TEL Unloading Lines Eliminate Many Unloading Problems

Users of Metal-Flex unloading installations designed by Du Pont report that they find many advantages which simplify TEL tank car unloading operations, improve safety and cut labor costs.

Flexibility, for example, eliminates the need for exact positioning of tank cars. This means that one man alone can connect or disconnect the cars. Because older style unloading lines had a tendency to bind, they frequently required two men for this operation.

Flexibility is especially important too, under snow and sleet conditions. Here the Metal-Flex installation is easier to manage than other types of unloading lines.

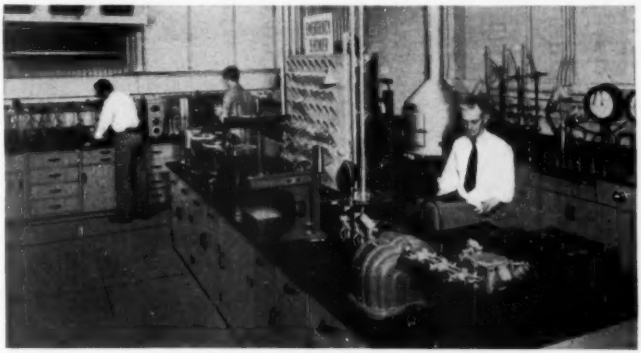
Safety is improved because leaks resulting from stresses are eliminated by the flexible hose and boom arrangement, which also eliminates repacking and the attendant hazards and expenses involved. For more information on the advantages and construction details of Metal-Flex unloading lines, contact your Du Pont representative.



Du Pont Provides Complete Laboratory Technical Service to Meet Specific Refinery Needs

Five fully-equipped Du Pont District Laboratories help refiners in economical use of additives

Whatever your additives problem, technical assistance is always close at hand. Five Du Pont Petroleum Chemicals Division District Laboratories are specially set up for this work. These are conveniently located in El Monte, California; Houston, Texas; Tulsa, Oklahoma; Chicago, Illinois and Wilmington, Delaware. Each is fully equipped to do any required type of testing on motor gasolines. All are happy to be your host if you are in the vicinity.



View of the West Coast District Laboratory inspection section which houses gasoline and light oils test equipment.

New Petroleum Chemicals District Manager Appointments

ALFRED R. MULLIS has been transferred to New York City as Eastern District Manager of the Du Pont Petroleum Chemicals Division to fill the vacancy created by the promotion of Charles Wirth III to Wholesale Sales Manager of the Du Pont "Kinetic" Chemicals Division. Mullis was formerly located in Houston, Texas, as manager of the Gulf Coast District.

Charles D. Towery, former manager of the Mid-Continent District, takes over as Gulf Coast District Manager and Robert M. Glover has been promoted to District Manager in charge of the Mid-Continent District with offices in Tulsa, Oklahoma.

Every day, more and more refiners are making use of this valuable service. And no wonder! It often means a substantial saving for them . . . in time, in money, in effort. And it frequently supplements their own laboratory activity. Here are a few of the many ways the Du Pont District Laboratory in your area can be of service to *you*.

TEL BLENDING STUDIES

To help check new stocks or determine TEL requirements for a specific blend, the District Laboratory will make tetraethyl lead response studies on any or all of your gasoline stocks.

In addition, many refiners use the Du Pont facilities as a check on results found by their own knock-test laboratories. You can also arrange to have fuels road rated by the Du Pont Test Fleet through the nearest District Laboratory. And qualified laboratory

OVER

PETROLEUM CHEMICALS DIVISION
NEWS

CONTINUED **District Laboratories**

personnel are prepared to assist you with proper operation of your CFR knock-test engines.

Since Du Pont supplies refiners with a *complete line* of gasoline additives, our District Laboratories are equipped

LABORATORY MANAGER KEN EDSON reviewing results of TEL blending study for a west coast refinery.

to help you gain added economy and efficiency in the use of additives other than tetraethyl lead.

ANTIOXIDANT EVALUATIONS

Du Pont Antioxidants, Nos. 5 and 22, are made to meet the widely varying response of different gasolines to antioxidants. To help you gain the greatest storage stability at the lowest cost, the District Laboratories will determine the most effective antioxidant for your particular stocks. Their recommendations, which include a complete treating plan, are based on induction period and storage tests, as well as standard A.S.T.M. gum tests.

COPPER CONTAMINATION

Whenever you desire, the laboratories can make a careful check on gasoline samples for the presence of copper. Where copper is found, their recommendations for the effective use of Du Pont Metal Deactivator often result in reduced antioxidant treating costs. In some instances savings have been 35% and higher.

DYES—STABILIZERS

Du Pont District Laboratories also provide a comprehensive dye evaluation service. And they are equipped for testing and evaluating additives for many petroleum products beside gasoline. These include fuel oil stabilizers and grease inhibitors.

QUARTERLY GASOLINE SURVEY

Another important job of the District Laboratories is evaluating the hundreds of samples collected every three months for the Du Pont Quarterly Motor Gasoline Survey. To assure that the surveys are both timely and accurate, the laboratory staffs often work day and night.

AT-THE-PLANT SERVICE

Whenever you want assistance on an additives problem *at your refinery*, a qualified member of our laboratory staff will be glad to work with your own personnel.

In addition to local facilities, our District Laboratories are backed by the specialized services of the Du Pont Petroleum Laboratory and by the broad, continuing research activities of the Du Pont Company.

MANAGES WEST COAST DISTRICT LABORATORY

KENNETH C. EDSON joined the Petroleum Chemicals Division of Du Pont in 1947 as manager of the West Coast District Laboratory in El Monte, Calif.

He came to Du Pont from the Southern California Gas Company, where he was supervisor of the Company's research laboratory. Edson joined Southern California as a process engineer in 1943. Previous to this he was a research chemist for the Skelly Oil Company in Pawhuska, Oklahoma.

After graduating from the University of Nevada, Edson studied for a year in the graduate school of Texas A & M College.

DU PONT Historical Highlights

ONE OF THE FIRST organized research efforts in the U. S. chemical industry was Du Pont's Eastern Laboratory, established at Gibbstown, N. J., in 1902. The original staff numbered 3, and was under the direction of Dr. Charles L. Reese.

Today, Du Pont has 42 research laboratories at 27 locations, staffed with 5,000 men and women, of whom 1,800 are engaged directly in research. With the recently completed $39-million post-war research laboratory expansion program, $33,000 is now invested for each research worker – an investment per man which nearly equals the amount it took to put Du Pont in business in 1802.

Literature—Movies Available

Here is a partial listing of the movies, bulletins, reports, booklets and aids available to you through the nearest Du Pont Petroleum Chemicals Division district office:

Pipeline on Wheels—A 26-minute full-color movie on tank truck safety.

What Makes a Gasoline Good—An 18-minute cartoon movie in color . . . on gasoline quality.

Tank Talk—A 52-page, easy-to-understand safety booklet for tank-cleaning crews Serial A-1134

DU PONT
Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • Wilmington 98, Delaware

District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

IN CANADA: Canadian Industries Limited — Toronto, Ontario — Montreal, Quebec

A-2827

Printed in U. S. A.

additional storage facilities for TEL are required. A conventional proportional continuous loss-in-weight blending unit is employed. During blending operations, the eductor pump takes suction from the 12-in. header to deliver 100 g.p.m. of blended gasoline through an eductor where TEL fluid is added automatically from the weigh tank. This leaded stream is returned to the main stream where it mixes to give the lead content required to meet octane number specifications.

At normal blending rates, the weigh tank has sufficient capacity for 3.8 days of premium gasoline blending and 7.6 days of regular-grade blending, using normal TEL requirements.

A study of eductor requirements by design engineers of Standard Oil Development Co. showed that the 2-in. eductor specified for unloading TEL will also serve satisfactorily as the blending eductor. A separate blending eductor originally planned was considered too limited in capacity to assure proper flexibility, hence it was deleted and the larger unit serves double duty. Maximum 2-in. eductor capacity for unloading TEL is 400 lb. per minute and normal blending requirements for premium grade gasoline approximate 68 lb. per minute.

A 4-in. line connecting virgin naphtha intermediate tankage with the suction of the eductor pump P-11 permits the unloading of TEL directly from tank cars on the blending-area siding, to the weigh tank. When unloading TEL, naphtha is returned to intermediate tankage through the 3-in. line shown in the flow chart. This system also provides naphtha for washing out the TEL tank car, during which operation the naphtha is discharged through the 12-in. header to product storage since it contains a small quantity of TEL. A film of commercial-grade glycerin is maintained in the weight tank to prevent TEL vapors from accumulating in the vapor space and to prevent air from contacting the underlying TEL fluid.

Dye Addition

The dye facilities, comprising two makeup pots, a circulating pump, (P-12) and an injection pump (P-19) are designed for use on yellow and red dyes. Each pot will hold sufficient dye solution to blend for 4 hours at 5,800 g.p.m. While dye solution from one pot is being injected into the main stream, a new batch is made in the other pot in preparation for the next blend.

The additive makeup pump P-12 takes suction on heavy cat naphtha through a 2-in. line connecting with intermediate storage, and discharges to the offstream makeup pot where the naphtha dissolves dry dye powder added manually through the top of the vessel. The makeup pump then circulates the mixture to insure complete solution.

Injection to the main blending stream is controlled by the dye injection pump. Both dye and additives are added at points upstream from the TEL injection point. A check valve located immediately upstream from the TEL connection prevents any leaded gasoline from backing up into the dye and additive facilities.

Additive System

The proportion of gum inhibitor required for blending to base stocks before transfer to an intermediate tankage depends on the gum-forming tendencies of the various stocks and their indicated length of time in storage. Metal deactivator, required to form a complex with any remaining copper from the copper chloride sweetening process, is also required in amounts varying with the volume of virgin and light cat naphthas charged to the two treating units. These additives can also be introduced in excess to the blended gasoline stream should product in storage fail to meet breakdown specifications.

Metal deactivator solution is made up in 300-gal. batches, each sufficient for about 8 days' normal requirements. Dry powdered chemical is added through the top opening of the makeup pot and mixed thoroughly with a commercial grade of benzene. The additive makeup pump takes suction on the benzene unloading manifold through the inhibitor circulation line and discharges to the makeup pot, then circulates the mixture until a uniform standard solution is obtained.

Benzene may be added to the stock solution of inhibitor during winter to prevent freezing. The two solutions are transferred by the all-purpose pump P-12 from makeup pots to gage pots, from which the desired proportions are added to blend stocks and to blended gasoline. Either additive or a mixture of the two may be injected by the motor driven proportioning pumps P-13—P-18. Injection rates are controlled by orifice meters which regulate the proportioning pumps by means of pneumatic control of the pump stroke. One spare proportioning pump P-15 is installed for injecting additive to the four blendstock streams en route to intermediate tankage. Bypasses around the pumps permit injection lines to be filled rapidly by gravity during startup.

The inhibitor pots and storage drums are blanketed with nitrogen to prevent degradation of the additive by oxidation. The stock solution of inhibitor and solvents can be mixed by bubbling nitrogen through the gas distributor into the bottom of the gage pots. Gage-pot vent lines are connected to a common header discharging to the dirty-water sewer in order to prevent spraying of additives in case of overflow.

The blending unit is capable of wide flexibility in producing motor fuels to meet current and future market requirements.

The unit shows further versatility in employment for maintenance, retreating, and product recirculation. Provisions have been made to drain the 12-in. header for maintenance purposes. A block valve located in the blending header prevents flow from product tankage when draining the 12-in. line. As shown in the diagram, blending pump P-9 can take suction on the lowest point in the header through a 6-in. line, discharging to intermediate tankage through the light and heavy cat naphtha rerun line. A connection for purging the header with nitrogen is also provided at the lowest point, and ¾-in. bleed valves are installed downstream of the discharge block valves of each blending pump.

The unit may be employed in re-running and re-treating virgin and light cat naphtha stocks. To rerun virgin naphtha, suction is taken on the intermediate tanks through the 6-in. off-specification naphtha line by a spare crude-feed pump located at the atmospheric pipe still. The pump is manifolded so that naphtha can be rerun in either the atmospheric or two-stage crude unit.

For re-treating virgin and light cat naphthas in the virgin naphtha copper chloride sweetening unit, the unit reflux pumps take suction from intermediate tankage through the off-specification naphtha line. Light and heavy cat naphtha can be rerun in the primary fractionator by taking suction on intermediate tankage with blending pump P-9 which returns the stream to the process unit via the cat naphtha rerun and off-specification naphtha lines. Flow recorders are provided on these alternate return streams.

Jet nozzles are installed on inlet lines to all product storage tanks to insure the thorough mixing of naphtha components and additives. A 10-in. recirculation line from product tankage, connecting with suction of blending pump P-4, has been installed to permit recirculation of gasoline if desired. Normally this line will not be used since the tank contents can be kept on specification by nightly checks, and by corrective proportioning of blending components during the following daytime blending period.

Future Revisions

An air distributor has been installed in the heavy cat naphtha transfer line between additive injection and intermediate tankage. This will permit the addition of air to speed up storage sweetening if found necessary in the future.

Diesel-Oil Blending

Unlike the shift-operated gasoline-blending system, the diesel-oil-blending unit is designed to operate continuously when on stream. It is tied directly to the rundown lines of two

(Continued on page 92)

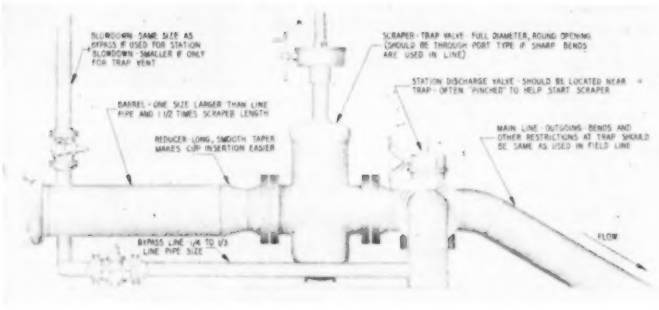


Fig. 1—Hookup of horizontal trap for outgoing line.

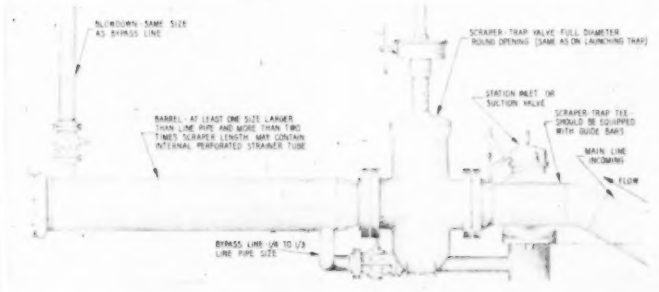


Fig. 2—Horizontal trap installed on incoming line.

Pipe-Line Scraper Traps . . .

. . . for natural-gas transmission lines

by Paul Reed
Pipe-Line Editor

Last week the author discussed the use of scraper traps on crude-oil and products lines. Here, he deals with their application on natural-gas lines, and in particular with advantages of "on-stream" practices.

THE recent demonstrations of the value of "on-stream" operation of pipe-line scrapers for natural-gas lines is bringing a revision of operating methods for maintaining line efficiency.

The gas-pipe-line scraper provides operators with a means for increasing the profit of gas transmission. This article deals with some of the features of scraping operations and the installation of scraper traps which will lead to easier and cheaper scraper operations.

Economic value of "on-stream" scraping.—The advantages of "closed system" or on-stream scraper operations were convincingly demonstrated when Texas Eastern Transmission Co. converted the Big-Inch and Little Big-Inch petroleum lines to gas operation. The scraper traps originally installed for petroleum service were left intact. First scrapers to be run on-stream under natural-gas conditions were of rubber-cap swab-type with no cleaning members. Removal of water and other materials by means of scrapers raised efficiency from 67 to 79.6 per cent. When cleaning scrapers were run, efficiency jumped to about 86 per cent and with a regular cleaning program it rose to about 92 per cent. When the cleaning program was temporarily halted, efficiency quickly fell off and then returned when cleaning was resumed.

With conventional gas-line facilities, Panhandle Eastern Pipe Line Co. has shown in recent years that periodic cleaning of natural-gas lines can increase throughput equivalent to the capacity of extensive looping.

Still, few natural-gas lines are now equipped with the scraper traps to run scrapers in closed streams. Several lines in Virginia, Arkansas, Louisiana, and Oklahoma are equipped with traps which provide for easy scraper insertion and removal but they necessitate section-by-section blowdown and consequent shutdown of parts of the facilities.

United Gas Pipe Line Co. and Texas Eastern are planning scraper traps for on-stream cleaning of their newest big-inch installation. This indicates a trend toward on-stream cleaning.

What operating conditions are needed for on-stream cleaning? A study of the characteristics of any line determines the frequency of the plan of scraper operations. These characteristics are only apparent from the results of actual scraper runs as reflected in increased throughput or better pressure drop reduction.

Need for high load factors.—The tendency of many modern lines to use full capacity during the entire year has increased the importance of frequent scraping. Seasonal variations of gas velocities will decrease as more lines take advantage of underground storage and oversize lines. Slack seasons will become less common, therefore it will be more inconvenient to shut down the systems for open-ended scraper operations.

Open-end cleaning.—The open-ended system of cleaning gas lines is undesirable from several standpoints. Open-end cleaning started when early gas lines were commonly operated below full capacity and the value of scrapers was overlooked.

Modern open-end cleaning calls for modern speeds, usually about 20 m.p.h. average, which gives a much better cleaning job with less hazard and less total gas consumption than the earlier high-speed methods. The speed through the system naturally varies. The scraper slows down upon entering a bend or other restriction compressing the gas behind it. On leaving the tighter section, the gas expands and higher speeds are developed. Actually, scraper travel in almost all gas systems consists of a series of accelerations and decelerations with occasional complete stops.

Obviously, radio contact between inlet, outlet, and intermediate check points does much to simplify open-end scraper operations which at best require much labor, equipment, time, and gas. Only during the construction period can open-end scraping be justified from an economic standpoint. After that, the shutdown time alone would require long operating periods of increased throughput to pay off. Old lines have been cleaned by this expensive procedure but the cost has been high.

Scraper operations.—Despite fluctuations in pressure and speed, better control can be maintained with

relatively small volumes of gas for moving a scraper through the line. Therefore, best procedure calls for opening the controlling or gas inlet valve until the scraper begins to move. Then the valve is left in this position, allowing the scraper to change velocity at will as the gas fills the line behind it. Unless an emergency occurs, such as prolonged stoppage, the valve is not further opened until the scraper is out of line. The valve is opened momentarily until the "blow" is clean and free of dirt and finally closed completely.

Gas and petroleum operations compared.—Now that scraper traps to facilitate on-stream operations are being adopted by gas lines, the problems of running scrapers in gas lines equipped with traps and full round opening valves are recognized as similar to the problems of running scrapers in crude oil or products lines. In fact, gas-line problems are somewhat less because less material is removed. Consequently drainage and disposal facilities are less than for petroleum lines.

Adapting older lines. — However, more problems may be encountered in running scrapers on-stream in gas lines not designed for scraper operation than in most liquid lines. First, all major projections into the line must be eliminated. Next, large-diameter side openings and intersections may have to be modified. Finally, an analysis of the remaining fittings must be made in order to choose the proper cleaning scraper.

Modern pipe-line scrapers are made to traverse a wide variety of fittings, but no one design will effectively serve all purposes. For instance, the scraper designed to negotiate 1½-radius bends will not usually pass through gate valves with wide seat-ring spacings. The scraper with the span required to bridge such a gap is likely to lodge in a sharp miter bend. Although many combinations of fittings can be used together, it is necessary that the operator know exactly what is in the line.

New scraper designs can take care of one or two different sizes or diameters. Gas systems having more than two diameters in pipe sizes would do well to have traps set at points of diameter change. Reductions in diameter, for short distances, and reduced-area gate and plug valves can be traversed in most cases, but if such reductions are very great, or if they are not of streamlined shape, the passage of scrapers would not be practical. Since scraper traps are installed to save time and labor they should take advantage of every practical feature for increasing efficiency.

Design features. — Experience has demonstrated that the horizontal type of scraper trap is the best for general service in both suction and discharge installations. A horizontal trap with oversize barrel should be mounted at a convenient height above the ground with a full round-opening

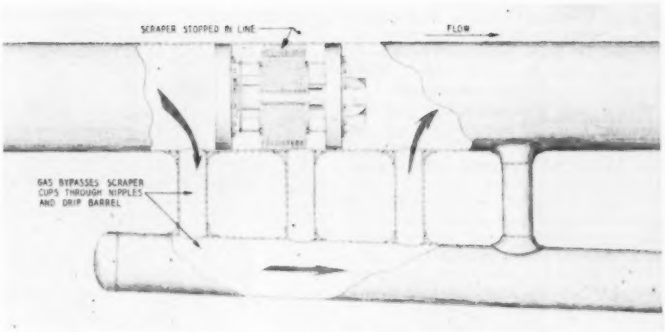


Fig. 3—How scraper can be bypassed at ladder-type connections.

valve. Adequate bypass, drainage, and vent or blowdown lines should be provided. There are basic differences between outgoing and receiving traps in regard to the lengths of the barrels and locations of the bypasses of the barrels and locations of the bypass lines as shown in Fig. 1 for outgoing traps and in Fig. 2 for receiving traps.

Launching traps.—The barrel diameter for this trap should be one size larger than the line pipe or scraper size and about 50 per cent larger than the scraper to be used. The bypass line should enter the trap at a point near the insertion or open end so that the flow will be introduced behind the rear cup of the scraper.

Receiving traps. — This incoming trap should have a barrel diameter at least one size larger than the pipe line and at least twice as long as the longest scraper to be used. The diameter might well be increased to aid in scraper removal and cleanout. Diameter must be increased if a tubular, perforated strainer is installed. Such a strainer should be one size larger than the line pipe, if possible, in order to facilitate scraper removal when the strainer is either inside or outside of the trap.

Although the barrel length could be increased, a longer trap is harder to clean out. Length must not be decreased as the double-scraper length has a twofold purpose: (1) preliminary cleaning space is provided for the inevitable debris, dirt, and scale and possibly a damaged scraper which may be brought in by another scraper; (2) when cleaning operations are carried on with a planned schedule, scraper traps of ample capacity have to be opened only half as often.

The bypass line for the trap should leave the barrel at a point near the reducer or valve end so that pressure is relieved from behind the trap as

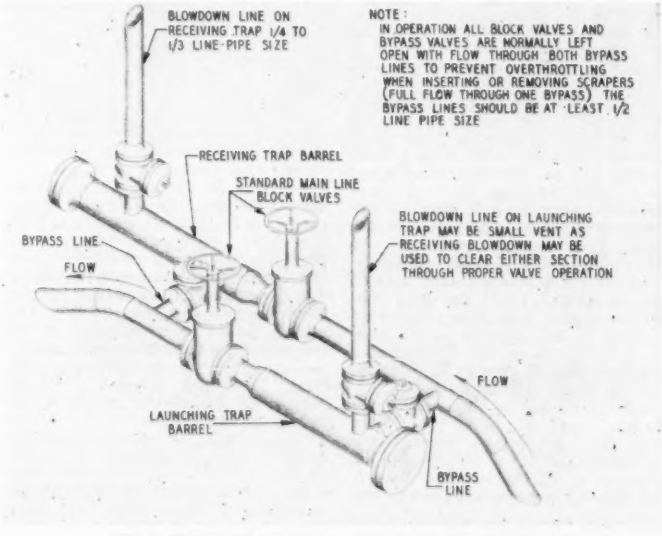


Fig. 4—Horizontal-barrel-type trap for intermediate locations.

soon as it enters the trap and before it hits either the flange or a previous scraper. In each instance the use of a quick-action flange of breech loading type is a definite advantage.

Drain and blowdown.—If the bypass lines leave the bottom of the traps, they collect liquids. Therefore they should be equipped with drains. A blowdown valve should be mounted on top of the barrel with a stack reaching well above ear level and preferably cut off at an angle. As a general rule, bypass line sizes should be about one-third the pipe line size for best results. The blowdown line should be the same size if it is to be used for blowing residue out of the line or for easing the scraper into the trap. A smaller blowdown will do if it is only for relieving pressure in the barrel. Valves on the bypass and blowdown lines should be plug type because of their quicker action and the possible presence of large quantities of dirt and scale. Naturally, all fittings should conform to the same standards as the rest of the station piping.

Pipe openings.—Piping to the trap should be as safe for scraper operation as possible. At the junction of the outgoing line from the launching trap and at the main station discharge line the scraper must necessarily pass a large-diameter side opening. This opening may be up to full diameter and should, if possible, enter the top or side of the line. If this tee branch or side opening enters the bottom or lower quadrant of the line and is more than three-fourths line size it should be equipped with guide bars as shown in Fig. 6 of a previous article.* This will keep the scraper from nosing down into the opening if the full stream has been diverted through the bypass to force the scraper out of the trap.

Lateral connections.—Some welding tees have an internal taper to a thick wall section opposite the branch which, together with the restricted diameter, tends to turn the scraper. If additional side openings such as a station bypass line or alternate compressor discharge are planned, they should not be immediately adjacent to the other openings. If the distance between center lines of adjacent side openings is equivalent to one scraper length plus one pipe diameter, any conventional scraper will pass safely. (This is not true for interconnected side openings.) Front and rear cups of the scraper may each stop at an opening if the opening center lines are too close. As shown in Fig. 5 of a previous article,* gas can pass around the sealing or driving members.

Interconnected side openings such as are found in ladder-type drips (Fig. 3) may bypass enough gas around the scraper to let it stop. This situation is affected by the number and size of side openings into the main line, the velocity of gas and scraper, and the amount of liquid in the drip barrel. In most instances safe scraper passage can be assured by filling the drip with water. On the other hand, this is often undesirable, particularly as one of the functions of the scraper is to reduce or eliminate the need of drips. With adequate scraper cleaning it is possible to eliminate the need of drips entirely.

The same recommendations regarding side openings are applicable to receiving traps. Near the incoming trap the main station suction line is a branch opening. Therefore a good portion of the stream of gas may be diverted through this branch line. This side opening, regardless of its position, should be equipped with guide bars unless operations are planned so that the full stream will always pass through the trap and bypass at scraper arrival. This is most important, as gas-line scrapers are often designed to traverse sharp bends of 1½ radius; therefore, they are short and easy to turn. Back pressures from trap restrictions and tee construction, as well as from diverging flow, will cause the scraper to turn into a tee. The effects of the back pressure from the trap can be minimized by positioning the suction tee at sufficient distance from the trap. This also allows a longer column of cushioning gas to bring the scraper to a halt.

The location of scraper traps in existing systems depends primarily on the position of incoming and outgoing lines and suction and discharge manifolds. In any event, the traps should be located where trucks can back up to the open ends. They should not be located where cleaning by flushing or hosing would be impractical, or where disposal of muck would be difficult. A concrete platform under and around the barrel facilitates cleanliness and safety. When possible, it is good practice to align both traps with each flange end facing the other about 30 ft. apart. This spacing provides room for work between the barrels and this alignment makes spooling a simple matter. Thus a station bypass capable of scraper passage can be quickly installed in event of prolonged station shutdown or removal.

In some instances, installation costs will have to be balanced against operating economy to determine whether traps such as shown in Fig. 4 can be located at intermediate points, or whether field changes should be made to eliminate their need.

A carriage developed by Texas Eastern is used for moving scrapers into and out of the traps. It is possible that the addition of an air cylinder, perhaps working from line pressure, might be convenient for moving large scrapers. Simple davits, "pig pushers," and properly located hoisting rings simplify handling.

Obstructions to scraper operation in old lines.—Some of the characteristics of old natural-gas lines are impediments to on-stream operation of scrapers. These obstructive features include miter bends and welding ells installed instead of the long sweeping bends. Furthermore, full-diameter round-opening valves were formerly not required and therefore reduced-area venturi-type plug and gate valves were used. In some cases large-diameter lines were laid before valve

(Continued on page 92)

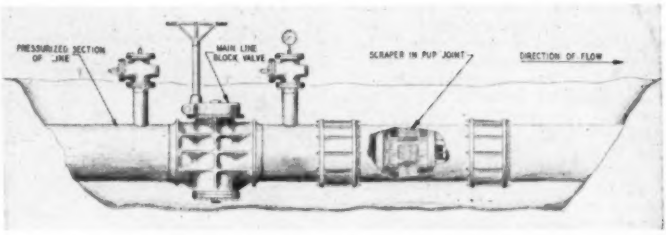


Fig. 5—Pup-joint method of placing scraper in pipe line.

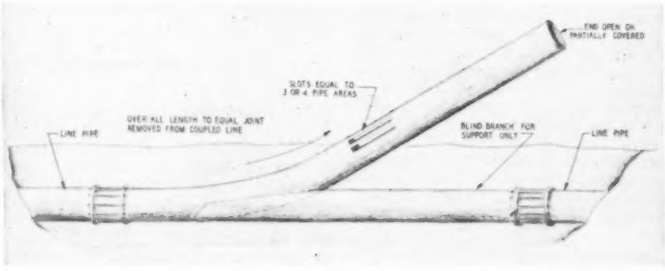


Fig. 6—Curved guide line for directing scraper out of ditch.

*Pipe-Line Scraper Traps for Crude and Products Lines. The Oil and Gas Journal, December 27, 1951.

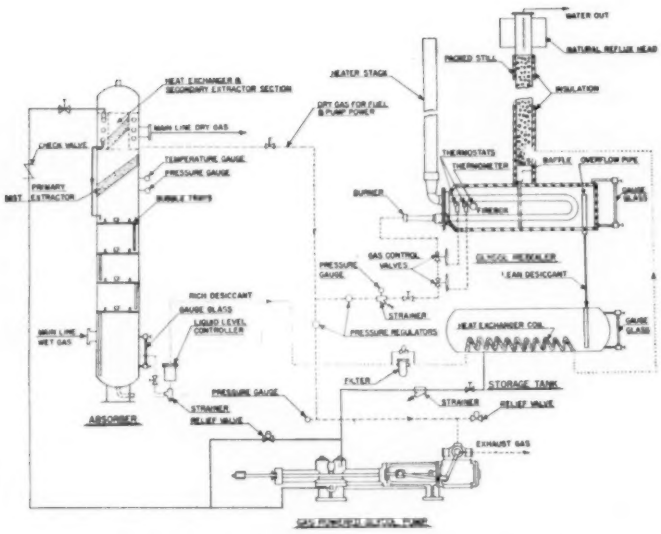


Fig. 1—Process-flow arrangement of gas-dehydration system.

Natural-Gas Dehydration

. . . using triethylene glycol

by Lawton L. Laurence*

DEHYDRATION of gas prior to its entry into gas-transmission lines is necessary to prevent water from accumulating in the line. Water accumulation in a gas pipe line is not desirable because:

1. It loads up the line reducing its gas-carrying capacity.

2. When the temperature of the gas drops below the hydrate-formation temperature the liquid water in the line forms hydrates which will plug off or greatly restrict flow of gas.

3. When carbon dioxide or other acid gases are present in the gas the presence of liquid water in the line results in a corrosive condition.

To eliminate water from natural-gas-transmission lines it is necessary to dehydrate almost all of the gas produced into these lines in small dehydration plants at or near the well head. This has resulted in a demand for a gas-dehydration system to meet certain requisites. These requisites are:

1. Low initial cost.

2. Adaptability to small single-well installations without a large increase in initial cost per unit of capacity.

3. Efficient operation at widely varying flow rates down to a small fraction of its rated capacity.

4. Low operating and maintenance cost.

5. Operable with minimum attendance and fully automatic.

6. Suitable for operation and maintenance by personnel with no processing-plant experience.

7. Dependability in producing dehydrated gas at all times.

8. Capability to dehydrate gas to pipe-line specifications under all conditions normally encountered in year-around operation.

Fig. 1 shows a typical flow diagram of a gas-dehydration system using triethylene glycol as a desiccant. Operating data from numerous plants of this type indicate that this system meets the requirements outlined above for most gas-dehydration problems. The initial installed cost of gas-dehydration systems of this type will vary with size and working pressure from approximately $1,500 per million standard cubic feet per day of capacity of systems designed for flow rates of 1 to 2 per million standard cubic feet per day to $500 per million standard cubic feet per day of capacity for systems designed for 50 per million standard cubic feet per day and above. A triethylene glycol-type gas-dehydration system will operate with almost equal efficiency at flow rates from 10 to 100 per cent of its rated capacity.

The operating cost of one of these plants as shown on the accompanying table is about 20 cents per million standard cubic feet per day of gas processed using electrically driven pumps. Using gas-powered pumps, this cost will be increased to about 40 cents per million standard cubic feet per day. Note that the operational losses of triethylene glycol are about 0.02 gal. per million standard cubic feet per day of gas treated. Operating data from several plants have shown that this low desiccant

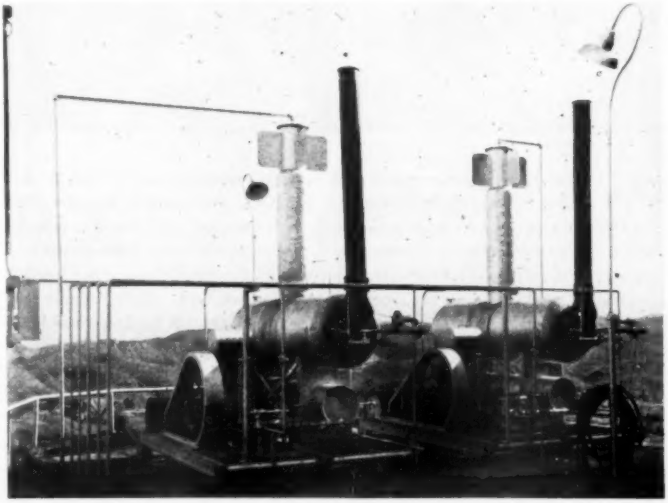


Fig. 2—Battery of triethylene glycol reconcentrators.

*Black, Sivalls & Bryson, Inc., Oklahoma City. Presented at A.S.M.E. petroleum mechanical engineering conference, Tulsa, September 1951.

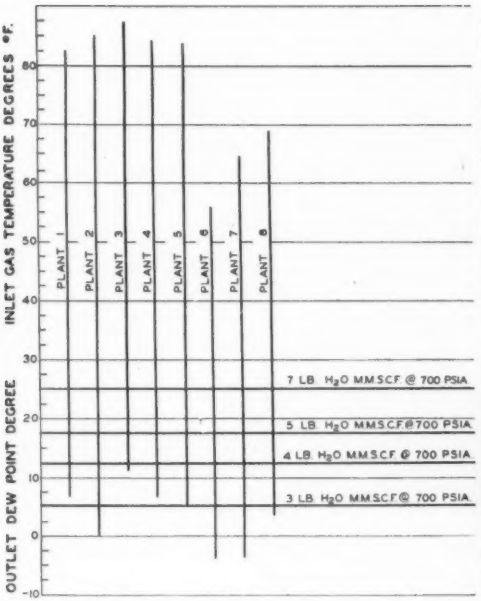


Fig. 3—Operational data on eight gas-dehydration plants.

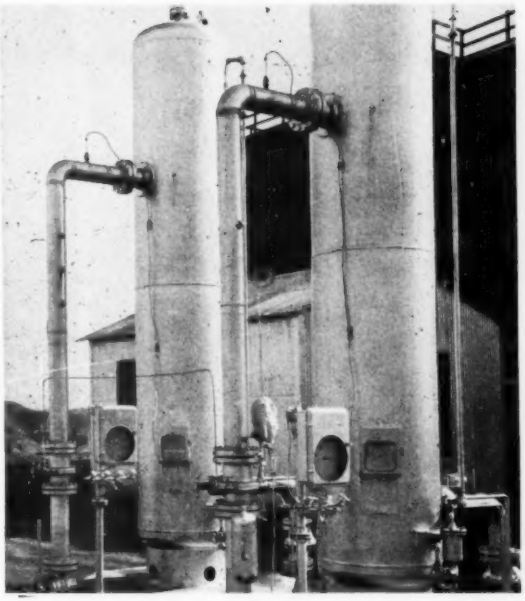


Fig. 4—Automatic control equipment in dehydration plant.

loss can be duplicated in any triethylene glycol-type gas-dehydration plant operating in a pressure range of 300 to 1,500 psig. with normal operating diligence.

Principal causes of larger losses are improper absorber design causing excessive glycol carryover with the gas and glycol spillage and leakage resulting from operating carelessness. These dehydration systems are fully automatic and require only an occasional check visit by the operator. Any operating difficulty which might develop can be quickly diagnosed and remedied by the operator, in a minimum of time. After a shutdown, the plant can be very quickly returned to operation, producing dehydrated gas immediately, requiring only the reboiler be brought up to operating temperature and the pump placed in operation.

The only moving parts on this system are the liquid-level controller on the absorber, the temperature controllers on the reboiler, and the pumps. These are all pieces of equipment with which most oil-field personnel are familiar and which require very little maintenance.

TABLE 1

Operating Cost Data on Triethylene Glycol-Type Gas-Dehydration Plant*

Gas flow (rated capacity), per million standard cubic feet per day	25
Fuel gas consumer, 11 M.c.f. per day	$2.75
Electricity used, 66 kw.-hr. per day ..	1.10
Glycol loss (approx.) 0.5 gal. per day	1.10
Average operating cost per million standard cubic feet per day of gas treated, cents	19.8

*"Installation, Operation, and Performance of a Skid-Mounted Gas Dehydration Plant," L. Harman Peahl, The Oil and Gas Journal, July 13, 1950, page 92.

Meeting Pipe-Line Specifications

To consistently meet pipe-line specifications of 7 lb. of water maximum per million standard cubic feet of gas, requires that a glycol desiccant be reconcentrated to above 98 per cent by weight. Triethylene glycol has a high decomposition temperature (408° F.) and an extremely low vapor pressure (0.0008 mm. of Hg at 80° F. and 21 mm. of Hg at 350° F.). Because of these properties triethylene glycol can be satisfactorily reconcentrated to as high as 99 per cent by weight in a simple atmospheric still with a direct-fired reboiler.

Fig. 2 shows two triethylene glycol reconcentrators; note the very short simple still columns. The low vapor pressure at gas contact temperature results in extremely small losses of triethylene glycol as a vapor in the gas.

Water dew-point depressions below inlet-gas temperatures for eight typical triethylene glycol-type natural-gas-dehydration plants taken from recorded operational data are shown in Fig. 3. Each vertical line represents a plant. The upper end of each line indicates the inlet-gas temperature read on the vertical scale. The lower end of each line represents the outlet dew point of the gas read on the vertical scale. The length of each line indicates the dew-point depressions in degrees Fahrenheit—below inlet-gas temperatures. The eight plants from which the data are taken were operating at pressures from 385 to 1,000 psig.

The heavy horizontal lines on Fig. 3 indicate dew points of a natural gas at 700 psia. with a water content of 7, 5, 4, and 3 lb. per million standard cubic feet per day. At 700 psia. the maximum water content of gas after dehydration by any of the plants shown, would be less than 4 lb. per million standard cubic feet per day.

As Fig. 3 would indicate, it has been found that at flowing pressures of 700 psi. and above, pipe-line specification of 7 lb. of water maximum per million standard cubic feet per day of natural gas can be consistently met so long as the inlet temperature of the gas is 90° F. or below. Specification gas can be obtained from triethylene glycol-type gas-dehydration plant at temperatures up to 100° F. by dehydrating at a pressure of approximately 1,200 psi. and at pressures as low as 400 psi. by maintaining an inlet temperature of 80° F. or below. Pipe-line dryness specifications for natural gas can be met with a triethylene glycol-type gas-dehydration plant in almost all installations where gas is being produced without compression, and where gas is being compressed with adequate cooling prior to dehydration.

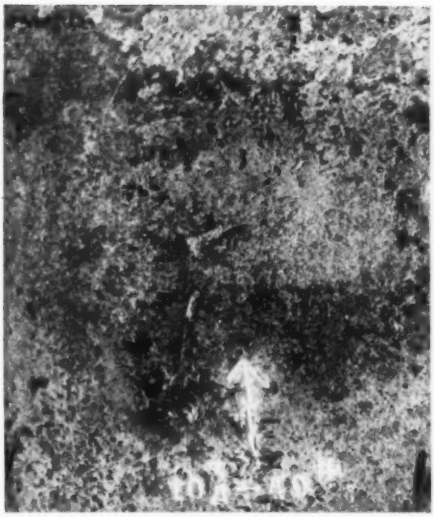


Fig. 1—Section of hot rolled pipe. Surface shows slight indications of containing a defect.

Fig. 2—Same area after 5-minute etch in hot dilute HCl.

Fig. 3—Also the same area after rolled-in slug was removed.

Internal Hydrostatic Pressure Testing

. . . as a measure of performance values of oil-well casing and tubing

by H. G. Texter*

This paper discusses acceptable methods of determining whether any given lengths of casing or tubing are capable of withstanding the forces to which they will be subjected in oil-well service. Then, after reviewing presently known methods, arguments are presented to show that high internal pressure testing is the most reliable and least expensive single method of checking performance values.

THERE are three principal mechanical forces tending to distort or destroy casing and tubing as used in oil wells today. These forces are:

Tension, from longitudinal loading.

Collapse, from unbalanced external pressure.

Bursting, from unbalanced internal pressure.

Other less important forces, or factors are:

Buckling, from placing the lower part of a string in heavy longitudinal compression.

Wear, from drill pipe, wire lines, tubing, or rods operating inside.

Erosion, from high-velocity fluids, especially mud or sand-laden fluid.

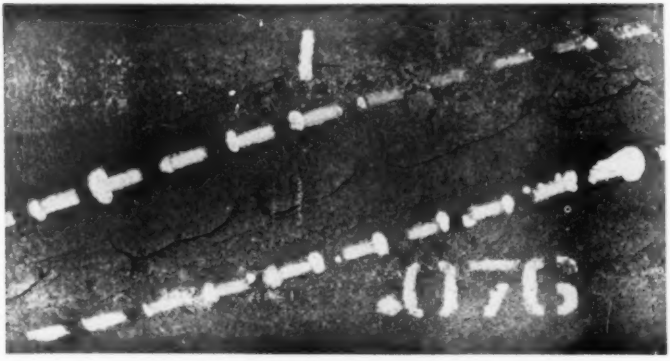


Fig. 4—Bad looking seam—not harmful.

Thread breaks, from shock or vibration fatigue.

Leakage, through the threaded connections.

Corrosion, chemical or electrochemical.

The generally accepted method of passing on the quality and sufficiency of tubular material is to check the dimensions and the physical and chemical properties against specifications set up by the American Petroleum Institute. These specifications were laboriously developed through the past quarter century by regular meetings of engineers representing manufacturers and those representing

*Chief field engineer, Spang-Chalfant Division, National Supply Co. Presented at Third World Petroleum Congress, The Hague, Holland, 1951.

users (the oil-producing companies).

These specifications have seldom remained static for long at a time but were continually being revised as new service conditions and troubles developed. At the moment they seem pretty well stabilized and are almost universally accepted throughout the oil-producing and pipe-manufacturing areas of the world. They are an excellent example of what can be accomplished by wholehearted cooperation of two diametrically opposite groups—the maker and the user. A review of the present A.P.I. specifications intended to assure proper performance values reveals the following recommendations, analyses, tests, and dimensional measurements:

Process of Manufacture of the Material:
- Bessemer steel
- Electric-furnace steel
- Open-hearth steel
- Wrought iron

Process of Manufacture of the tube:
- Furnace lap-welded
- Seamless
- Electric welded

Chemical Properties (of the material):
- Maximum allowable phosphorus and sulfur content

Physical Properties (of the rolled tubes):
- Yield strength (minimum)
- Tensile strength (minimum)
- Elongation (minimum)

Tests (of the rolled tubes):
- Mill-inspection hydrostatic test (internal)
- Flattening test (of rings or crop ends)

Standard Dimensions and Weights:
- Outside-diameter tolerance
- Wall-thickness tolerance (eccentricity)
- Weight (per foot) tolerance

Drift Requirements (for checking inside diameters of tubes).

Defects, outside or inside:
- Limit of depth specified but allowable area not specified

Thread elements, for tube or couplings:
- Pitch diameter (size)
- Lead tolerance
- Taper tolerance
- Thread depth tolerance
- Thread length
- Eccentricity and alignment tests

Minor Specifications (having no bearing on service performance):
- Range length tolerances
- Marking specifications, etc.

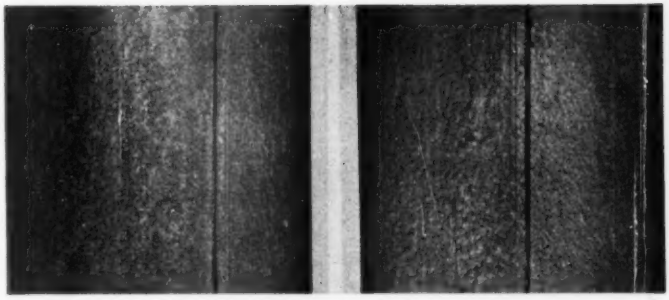


Fig. 5—Round-bottomed plug scores—not harmful.

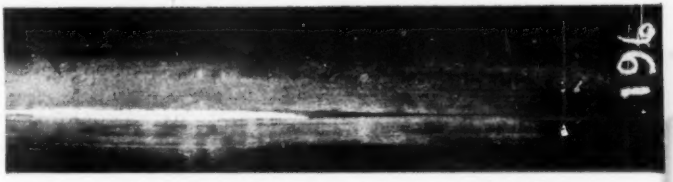


Fig. 6—Sharp-bottomed plug score of type which causes failure.

Standard Mill Inspection

Now, of all the above specifications there is actually only one requiring a mill test which is directly related to the performance value of the product and it does not go far enough. This is the mill-inspection hydrostatic test which, as a standard requirement, is limited to 3,000 psi. maximum. The other requirements, of course, have some bearing on the problem; but no single one of them, nor all of them combined, can give positive assurance that the product will withstand field service in a well.

The chemical properties, for example, have so little bearing that the specifications are limited to maximum sulfur and phosphorus content. This is intended to guarantee ductility of the metal, but any metallurgist knows that it is only a feeble step toward the objective.

The same may be said for the process of manufacture of the material. In fact, practically all process methods of producing wrought iron or steel are permitted.

The process of manufacture of the tube specification is a little more positive. At least it precludes the casting method of making casing or tubing. Also it does not permit use of the butt-weld process, by which the major tonnage of small-size gas and water pipe is manufactured.

Flattening tests, by which rings or crop ends of tubes are crushed dia-

Fig. 7—Deep seam which did not fail at pressure of 10,500 psi.: 7-in.-o.d., 23-lb., N-80 casing.

Fig. 8—Still deeper seam than Fig. 7 which did not fail at 10,250-psi. pressure.

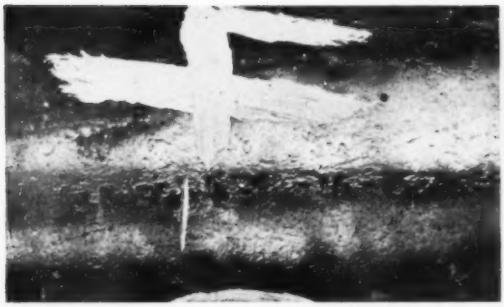


Fig. 9—Seam in a length of 3½-in.-o.d., 9.30-lb., N-80 tubing which did not fail at 15,000-psi. pressure.

Fig. 10—Acid-etched defect, previously almost invisible, which leaked at only 3,000-psi. testing pressure.

metrically between plates, give some indication of ductility or perfection of weld; but they certainly do not relate directly to the services for which the tube was rolled. At best such tests can only sort out grossly mishandled lengths or ones which were erroneously produced from the wrong grade of steel.

Dimensions and weight specifications are of value in determining that the proper size and weight per foot is delivered to the user. These specifications only very indirectly insure that the product will serve its intended purpose.

The thread element requirements are of great importance in joint strength and resistance to fluid leakage; but other factors, such as thread lubricant and proper makeup, are of almost equal importance and are beyond the control of the manufacturer as far as makeup in the field is concerned. Therefore, here again, compliance with the specifications is no assurance of performance in a well.

Minor specifications, such as range length tolerances, concern ease of handling by the user. The same might be said of the marking requirements, paint stenciling, and such like specifications.

Of very great value are the physical-properties requirements for tension tests, of strips (or full sections in the smaller sizes) cut from finished tubes. Minimum figures are specified for each of the A.P.I. grades and compliance with them is at least an assurance that the proper grade of iron or steel was processed and the product should, therefore, meet the performance properties of casing and tubing as listed in A.P.I. Bulletin 5C2.

The limitation of tensile tests is that they are not and cannot be required on each individual tube except at an exorbitant cost. The maximum requirement is that one tensile test in each lot of 200 lengths or less shall be made. Even admitting that tensile tests can be considered as a measure of performance values it is evident that this is only a "spot checking" method of appraisal.

Workmanship and Defects

Most controversial of all the A.P.I. specifications concerning workmanship and defects are Paragraphs 39 and 40 on page 20 of A.P.I. STD 5A, Sixteenth edition, June 1950. They read:

"39. Workmanship. The finished welded pipe shall be reasonably straight and free from injurious defects, such as defective welds, pits, blisters, slivers, and laminations. The finished seamless pipe shall be reasonably straight and free from injurious seams and defects. Pipe ends shall not be rounded out by hammering to secure conformance with threading requirements."

"40. Injurious Defects. When the depth of defects of either seamless or welded pipe is in excess of 12½ per cent of the tabulated wall thickness, such defects shall be considered injurious; welding or patching of such defects is not permitted."

In the author's opinion, strict adherence to the wording of these paragraphs not only fails to assure performance values of any given tube but leads to discarding of appreciable tonnages of casing and tubing which would be more than satisfactory for use in oil and gas wells. **After all, an oil-producing company is not much interested in the surface appearance of its tubular material but does want it to hang together in the well and resist external and internal pressures** up to the minimum figure published by the manufacturer. These are the collapse resistance, joint strength, and internal yield pressure figures in A.P.I. Bulletin 5C2: "Performance Properties of Casing and Tubing."

A "pit," as referred to in the above-mentioned paragraphs, may be defined as a depression resulting from a rolled-in slug or sliver of metal which later may fall out, or be pried out by hand. This is illustrated in Figs. 1, 2, and 3, with their self-explanatory notes. Incidentally, the photograph in Fig. 1 indicates very clearly why certain defects sometimes are passed by mill inspectors. Later, with repeated handling and shipping, the indication of the pit becomes more evident, as in Fig. 2, and eventually the offending piece of metal may fall out, as in Fig. 3.

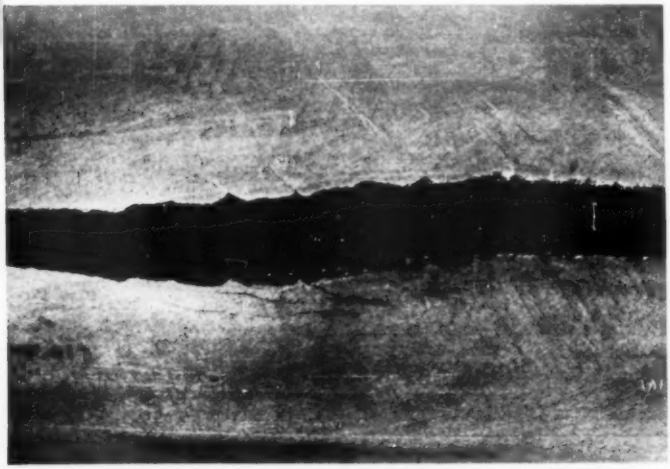


Fig. 11—A "reeler spinner" (mill defect) which failed at 3,200-psi. pressure.

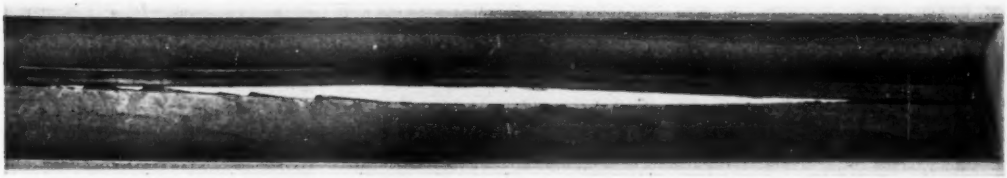


Fig. 12—An "inside fold," in tubing, which burst at a pressure of 7,350 psi. in a well.

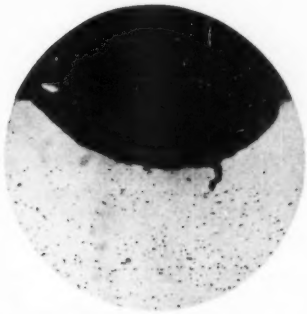


Fig. 12a—Photomicrograph of cross-section of inside fold shown in Fig. 12 (X 100).

Now, it must be self-evident that if the pit is small in area it can have only a very small effect on the tensile, collapse, and burst-strength characteristics of the tube even though the depth is much more than 12½ per cent of the wall thickness (12½ per cent is the limit of depth of a defect allowed by A.P.I.). On the other hand, if the area is quite large, a pit which is, say, only one-half the allowable depth could adversely affect the strength characteristics by a measurable amount.

As an extreme example, imagine a 1/32-in. diameter hole drilled 95 per cent through the wall of a piece of casing. No calculations are needed to show that the effect on the strength characteristics is negligible, whether we consider tension or collapse or bursting. Yet a longitudinal defect of half this same depth, say 3 in. long, could be fatal as far as burst strength is concerned. Or, if it were a transverse defect it would not need be very long to be fatal as far as tensile strength is concerned.

In other words, the wording of Paragraphs 39 and 40 is rather meaningless because it does not consider the area or shape or direction of the defect. Seams, for example, can be notoriously bad looking (as in Fig. 4); yet experience has shown that they very seldom result in failures in service even though their depth is several times the A.P.I. allowable of 12½ per cent of the wall thickness. This is because their direction and origin make them much less susceptible to failure than would be imagined.

Also, consider a defect occurring in the inside of seamless tubes known as a plug score or ball cut (see Fig. 5). If a score happens to be **round bottomed** it may be well over 12½ per cent in depth and still not be the focal point for failure from either tension or collapse or burst.

In 1944 an exhaustive study was made of 64 lengths of 5½-in. o.d., 17-lb., J-55 casing rejected from a lot of 363 lengths for various defects, including plug scores. Two tubes with scores similar to Fig. 5, and which were effectively 16 per cent of the nominal wall thickness in depth, were hydrostatically tested to failure. One burst at 11,500 psi. and the other at 11,700 psi., **but neither one failed in the plug scores.** (Theoretical burst strengths based on **actual** ultimate strengths of these tubes would be 11,900 and 11,600 psi., respectively.)

If the plug score is sharp bottomed, as in Fig. 6, the tube will almost surely burst in the score, even though the depth is less than half the allowable. The tube illustrated failed at 6,000 psi. whereas it should have withstood at least 11,100 psi. Here, again, the specification has given an arbitrary depth limit with no regard to shape or direction of the defect. It "strains at gnats and swallows camels."

Even for drill pipe, not under consideration in this paper, it is being pretty definitely proved that surface defects have almost negligible effect on performance. The reader may refer to an A.P.I. paper, "Field Test on Rejected Drill Pipe"[1] by A. W. Thompson and the writer, presented during the twenty-eighth annual A.P.I. meeting at Chicago, on November 8, 1948 *(The Oil and Gas Journal, November 11, 1948, page 252).* It describes the field use of a 5,300-ft. string of 4½-in. drill pipe made up entirely of mill-rejected lengths. Some of the defects, mostly seams and pits, were up to **twice** the A.P.I. allowable depth. While drilling 46,458 ft. of hole, in West Texas wells, 21 failures occurred, **not one of which was in a mill defect.** The failures were the result of corrosion fatigue, and it is significant that the surface defects did not even act as focal points for corrosion attack, let alone cause fatigue failures.

It might seem that some of the foregoing comments are a condemnation of the present A.P.I. specifications. **Not at all.** Until wells were drilled quite deep and pressures rose to their present levels, the specifications were quite adequate and, except for Paragraphs 39 and 40, they served to sort out and approve tubular material which adequately served the oil industry. The writer simply wishes to point out that we have now reached the point where some sort of proof testing of **each** length of casing and tubing is needed so that we may **know,** and not just hope, that it will have the desired performance values.

Proof Testing

The A.P.I. is recognizing the need of some sort of proof testing and the development of a performance specification has been on the agenda of the pipe committee for a number of years. So far no great progress has been reported except that attempts have been made to develop apparatus and equipment for conducting performance tests on short sections of pipe. However, testing short sections is still not all that could be desired.

If cost were no item, the ideal way of proof testing would be to subject each single length of casing and tubing to some high percentage of the various stresses that tend to cause failure in a tube. Thus, before running, each length would be pulled in

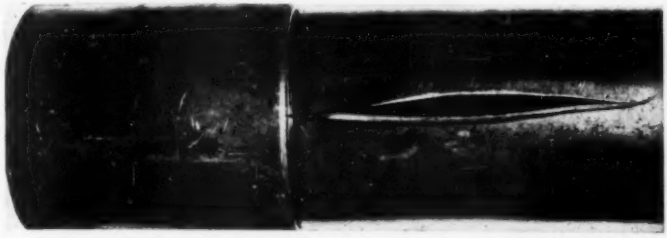


Fig. 13—Burst failure in a very innocent-looking defect.

a tensile testing machine, to, say, 80 per cent of the yield strength of the size, weight, and grade of material involved. Also, it should be subjected to external pressure in a collapse chamber to 80 per cent of its published collapse strength figure; and likewise the same for its internal pressure yield-point figure.

Obviously, proof testing in tension or in collapse would be entirely too expensive, but this is not true of internal-pressure testing. Internal-pressure testing, at least to nominal pressures, has been in vogue for many decades — long before seamless casing and tubing was introduced into the United States market. (Seamless was in use in Europe before its adoption in this country for oil-country use.) Being originally a test of the weld (of lap-welded pipe), the pressures were relatively low. In fact, the top limit required to meet A.P.I. requirements is still only 3,000 psi.

Lately the A.P.I. has realized the need of proof testing casing and tubing and, since tension and collapse testing of full lengths are out of the question, has set up **alternative** hydrostatic test pressure figures based on 80 per cent of the specified minimum yield strengths as calculated by Barlow's formula:

$$P = \frac{2St}{D}$$

where:

P = test pressure in psi.
S = minimum yield strength for grade involved
t = nominal wall thickness in in.
D = outside diameter in in.

To take care of these new, alternative high-pressure tests, American pipe manufacturers are now installing test benches in their plants for handling pressures up to at least 10,000 psi. These are very expensive units, but the additional charges for testing to the new high figures will be nominal and will be more than justified by the assurance to the user that the product has adequate strength.

In addition, there are mobile field units already available—many of which can test above 10,000 psi. These units can take care of shipments of pipe which were not high-pressure tested at the mills, and they are becoming increasingly more in demand as their practicability becomes evident. In fact, some users prefer field testing, after being convinced of its value, because they feel more confident of the results when the work is done just before running the pipe and under their direct supervision.

Fig. 16—One of nine lengths of 6⅝-in.-o.d. N-80 casing which failed in field testing 13,000-ft. string.

Fig. 17—A length of N-80 casing 7-in.-o.d., 29-lb. which failed by bursting in a high-pressure well.

We should consider, now, the reasons for believing that high-pressure testing is the most reliable single method of checking performance values. How can one have any assurance that a tube which withstands a high internal pressure will withstand tension and collapse forces of comparable magnitude?

To this question there is one compelling argument. All tubes, whether made by the lap-welded or electric-welded or seamless method, have practically equal directional strength properties except for ductility. The reason for this is that the reducing, by hot rolling, of the cast ingot into blooms and then into strip or rounds always proceeds longitudinally so that the nonmetallic particles and the dendritic structure of the ingot are elongated in the direction of rolling. It is because of this phenomenon that a difference is to be expected when steel is tested in different directions. The optimum properties are obtained parallel to the direction of rolling.

High Internal Pressure Test

Therefore it would be better to test in the direction of least ductility and if the test meets a specified figure it is almost certain that testing in any other direction would meet at least as high or even a higher figure. This is exactly what is being done in an internal pressure test as opposed to a proof test in tension.

It is true that a collapse test is also testing in the direction of least

Fig. 14—(Right) Failure in 7-in.-o.d., 26-lb., N-80 casing which occurred in well.

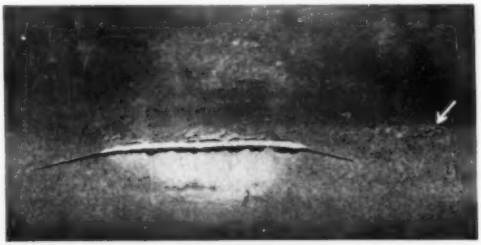


Fig. 15—(Below) Field-test failure of an improperly annealed length of casing.

ductility, but since the transverse stress is now one of **compression** instead of **expansion** the chances of failure at a given stress are less. A deep seam for example would tend to close rather than open under a collapse test.

Out-of-round tubes, of course, might collapse at too low a pressure, but would withstand the specified internal pressure. This contingency, however, is covered by the diameter tolerances of the A.P.I. specifications. Also, high internal stress[3] can lower collapse resistance and not affect resistance to internal pressure, but there is no presently known method of evaluating this condition except by a collapse test, the cost of which would be prohibitive except as an occasional spot check.

From the above considerations it may be concluded that a tube which meets the dimensional requirements may be proof tested by internal pressure with fair assurance that it would not fail under tension or under collapse if it passes a high internal-pressure test.

In 1945 Kettenburg and Schmieder (Shell Oil Co.) presented an A.P.I. paper on "Oil Well Casing Failures"[2] and came to the conclusion that, ". . . present A.P.I. standards do not assure adequate joint and bursting strength to meet deep-well requirements." Up to date there have been no major changes in the specifications except the addition of the alternative hydrostatic test pressures, which are not yet mandatory.

H. N. Marsh (General Petroleum Corp., Los Angeles) in commenting on an A.P.I. paper by John Wais, Jr., (Recent Developments in Casing Standards and Design)[4] made the following statements:

"Hydrostatic - pressure testing not only gives assurance of ability of pipe to withstand bursting, but also gives considerable assurance of the overall excellence of the product and, therefore, is some assurance against tension and collapse failures."

In another paragraph Marsh states: "It is the thought of many users that every joint of casing should be tested at the mill to at least 80 per cent of its yield, based on nominal wall thickness. This would give direct assurance of resistance to bursting, and indirect assurance of resistance to tension and collapse."

Discussion of Illustrations

At this point it should be interesting to review records and photographs involving internal pressure testing and studies of actual burst failures which occurred in wells or in mill-testing operations. These are the results of years of study made by the pipe plant, at Ambridge, Pa., for which the author has served as a field engineer for over 25 years. This review can best be made by showing photographs and commenting thereon.

Fig. 7 illustrates a seam in 7-in. o.d. by 23-lb., N-80 casing which did not burst at 10,500 psi. The 80 per cent of the minimum yield pressure would be 5,800 psi. Depth of seam as measured in the ground notches was 0.066 in., which is 20.8 per cent of the nominal wall thickness (0.317 in.). Note that the depth of the defect is well over the 12½ per cent allowed by A.P.I. Paragraph 40; yet the tube did not burst even though the test pressure was almost double the 80 per cent of minimum yield figure.

Fig. 8 illustrates a still deeper seam in 7-in. o.d. by 23-lb., N-80 casing which did not fail at 10,250 psi. Depth of seam was 0.073 in., which is 23 per cent of the nominal wall.

Fig. 9 is a 3½-in. o.d. by 9.30-lb., N-80 tubing containing a seam which is just within the depth tolerance allowed by A.P.I. Actual depth was 0.028 in., which is 11.0 per cent of the nominal wall (0.254 in.); but the tube did not burst at 15,000 psi. although the 80 per cent of the minimum yield pressure is only 9,300 psi. Note that testing this size and weight to 15,000 psi. imposes a transverse fiber stress of 103,500 psi., which is far beyond the minimum yield strength of N-80 material.

Fig. 10 shows a small piece of metal rolled into the outside of a length of 2⅜-in. o.d. by 4.70-lb., J-55 tubing. (If or when such a slug falls out, the resulting depression is known as a pit.) In pressure testing, the defect leaked at 3,000 psi. (80 per cent of minimum yield is 6,200 psi.). Such defects, which are usually covered by mill scale, are almost impossible to see by visual inspection and, anyway, a strict interpretation of A.P.I. Paragraph 40 would have passed such a defect because the measurable depth would be well within the allowable 12½ per cent tolerance. Yet it leaked at less than one-half of the newly approved alternative test pressure figure and could easily have failed in a well.

Fig. 11 shows a length of 5½-in. o.d. by 14-lb., Grade J-55 casing which failed in a mill defect at 3,200 psi. In mill language, this was a "reeler spinner." It became "cold worked" because it failed to advance in one of the crossrolling operations and stress cracks developed, which are barely visible in the photograph. **It would not have been caught by anything short of pressure testing** and if the pressure had stopped at the presently required maximum of 3,000 psi. it would have been passed as good product. The new, alternative pressure figure (80 per cent of minimum yield) for this size and weight and grade is 3,900 psi. It failed at 3,200 psi.

Fig. 12 shows a length of 2⅞-in. o.d. by 6.50-lb., Grade N-80 tubing which burst in "an inside fold from the high mill." It is a modification of a "ball cut" or "plug score" which became folded. The tube burst at 7,350 psi., but the alternative test pressure figure is 9,700 psi. Not being very deep, the defect would have passed all other A.P.I. requirements and would not have failed at the A.P.I. standard test pressure figure of 3,000 psi.

Fig. 13 shows a length of 5½-in. o.d. by 14-lb., Grade H-40 casing which failed at 2,500 psi. (2,800 psi. required) in a longitudinal mill defect, origin not certain. The defect

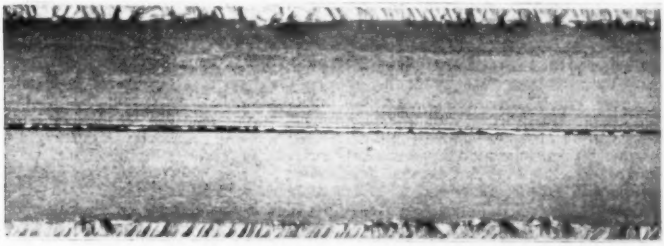


Fig. 18—One of eight lengths of tubing which failed while recompleting a well.

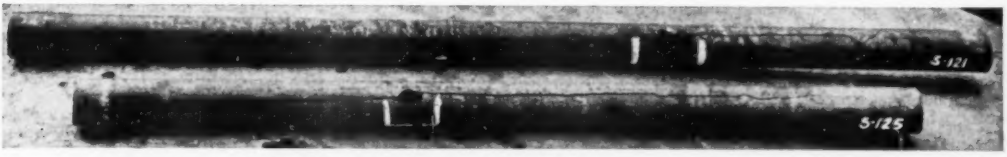


Fig. 19—Mill test failures of experimentally produced 5-in.-o.d., N-80 casing.

appeared, after failure, to be about ⅛ in. deep and possibly could have been caught by visual inspection; but in all probability **9 out of 10 inspectors would miss this type of defect.**

Fig. 14 illustrates a burst failure in 7-in. o.d. by 26-lb., N-80 casing. It occurred while pumping down a plug, after cementing in a well, at an indicated pressure of 1,500 psi. However, the sudden stopping of the plug could have built up a momentary surge of pressure more than twice this figure. This failure very evidently is the result of a mill imperfection, as indicated by the arrow. After bursting, the split was enlarged by cutting action of the high-velocity, escaping mud.

The maximum depth of the defect in the unfailed section was about 0.025 in., which is only 7 per cent of the nominal wall and therefore within the A.P.I. specification. Had the tube been high-pressure tested at the new, alternative figure of 6,600 psi. it surely would have failed and the user would have been saved a $3,600 repair cost, to say nothing of lost production.

Fig. 15 shows the result of a field test on a length of 7-in. o.d. by 29-lb., N-80 casing. It failed at 6,800 psi. while trying to reach 7,500 psi. required by the alternative, 80 per cent of the minimum yield figure. Examination indicated that the length had not been properly annealed but that it had passed a special mill test of 5,000 psi. Being a metallurgical error, this tube would have passed **all** A.P.I. requirements. Possibly some sort of electrical surveying instrument could be devised to indicate this sort of defect, but only a high-pressure test would positively find and evaluate it.

Fig. 16 illustrates the type of burst failures which occurred with nine lengths of 6⅝-in. o.d. by 24 and 28-lb., N-80 casing while field testing a long string before running in a Wyoming high-pressure well. Test pressure desired was 6,600 psi., but failures occurred at 1,200, 3,200, 4,200, 4,700, 5,000, 5,000, 5,400, 5,400, and 5,700 psi.

Careful laboratory examination revealed no very certain reason why these lengths failed. Chemistry, physical properties, dimensional tolerances, etc., were excellent and any pipe company or inspection laboratory would have passed every one of the lengths as good product. It was finally deduced that some processing procedure, such as cold straightening before normalizing, had introduced some fatal internal stresses. Anyway, only high-pressure testing caught these tubes just before being run in a very deep well.

Fig. 17 is a failure from a West Texas high-pressure well. This is a length of 7-in. o.d. by 29-lb., N-80 casing which had been field inspected and passed by one of the well-advertised field inspection services. The cause of the failure is not known, but it is an excellent example of a defective tube which undoubtedly would have failed in a high-presurse test. It actually failed, in the well, at a pressure well below the A.P.I. alternative test figure of 7,500 psi.

Fig. 18 illustrates one of eight failures in a 3-year-oil string of a 2⅜-in., 4.70-lb., Grade N-80 tubing. Failures occurred at pressures ranging from 3,200 to 5,000 psi. while trying to recomplete the well at a different producing strata in a Louisiana oil field. All of the failures examined had occurred in plug scores (ball cuts), all of which were well within the A.P.I. allowable depth tolerance. The tubes should have withstood at least 9,000 psi. (alternative A.P.I. test figure).

The two tubes illustrated in Fig. 19 were experimentally produced, on a mill rolling of 5-in. o.d. by 18-lb., N-80 casing, and failed under hydrostatic test pressures below 5,000 psi. The alternative A.P.I. test figure would be 9,300 psi.

The mill metallurgist, in discussing the failures, reported that, apparently, "this pipe was straightened in, or below, the martensite temperature range for Grade N-80 and that martensite formed in segregated areas which are usually located near the inside diameter resulting in an extremely hard, brittle constituent that cracked during straightening."

Now, theoretically, it would have been possible to have located the minute, internal cracks by some sort of tedious, internal magnafluxing procedure; but the chances of eliminating all defective tubes would have been slight. Furthermore it would be impossible to decide through such inspection which cracks impaired the performance values and if so to what extent. Hydrostatic testing affords some predetermined performance values.

Surface Imperfections Not Corrosion Focal Point

Assuming the reader is now interested in the idea that high-pressure testing is a fair measure of performance values, there still remains a question which has often been propounded to the writer. Will not pits and seams and other surface imperfections be focal points for corrosion and especially if their depths are beyond the A.P.I. allowable of 12½ per cent? This is a logical question and deserves an answer. It is believed that the answer is "no."

To the writer the most significant indication that surface blemishes are not focal points for corrosion is that in 25 years of observation of pipe troubles no cases of corrosion failures in mill defects have ever come to his attention. This does not prove that such failures have never occurred but simply that they are very rare.

It might be argued that when casing fails from corrosion it is very seldom recovered and therefore cannot be investigated. But this is not true for tubing, which is subject to the same types of mill defects as casing. Here, again, the writer has never yet seen a corrosion failure which seemed to bear any direct relation to a mill-formed discontinuity of the type covered by A.P.I. Paragraphs 39 and 40.

There are several speculative reasons for believing that surface defects need not be feared as focal points for corrosion. The principal one is that depressions, such as pits, are formed while the tube is hot and there is a substantial film of mill scale over their surfaces. Being below the outside diameter of the tube the scale is not broken off by the subsequent operations of sizing, cold straightening, and threading. Therefore the bottoms of pits are coated with a relatively corrosion-resistant film and the deeper the pit the less chance there is of the film being broken.

If, by chance, the scale at the bottom of a pit has been broken away there is still another factor which keeps corrosion from proceeding very far in that particular spot. This is the tendency for any depression, no matter how formed, to become filled with the products of corrosion and thus polarize itself against further attack. Iron oxide, if kept in place, is a very excellent protective coating.

Seams, often called "overlaps," are still less subject to corrosive attack. Being the result of torn open slag stringers their adjacent flanks are perfectly coated with a corrosion-resistant nonmetallic film. It is true that such a nonmetallic film, adjacent to iron, becomes the negative pole of an electrogalvanic cell and the iron will be attacked by an electrolyte, such as salt water, which might be present. Very soon, however, the area of corrosion becomes an extremely narrow slit and the products of corrosion will thoroughly protect this slit from further attack. In other words, it acts like an elongated pit with almost zero width.

At this point the reader is again referred to the Thompson-Texter paper, "Field Test on Rejected Drill Pipe."[1] Being purposely run in corrosive, salt-water muds there was every chance for corrosion to have concentrated itself in the mill defects. **But it did not.** Two additional similar lots of drill pipe, with still worse defects, are being run right now in West Texas and, at the time of completing this paper, no defect has yet shown the slightest tendency of concentrating corrosion in or adjacent to itself.

In the case of tubing, a much more effective cause for localized corrosion is the metallographic difference in grain structure at heat runout zones. If upset tubes, where the ends were heated for the upsetting operation, are not completely normalized there

can occur a type of attack known as "ringworm" corrosion. This is due to a slight difference in electro potential between the grain structure of the rolled tube and of the zone heated for forging and concentrated corrosion will cut through the tube in almost a perfect circle. Such corrosion cannot be attributed to a "mill defect" but to a "metallurgical defect" and is beyond the scope of this paper.

Early in 1950 a group of 36 small sections of seamless pipe—about 4 by 6 in. in area, each containing a recognized mill defect— were placed in very corrosive, well-aerated, effluent water in the Howard-Glasscock area of West Texas. Twelve of the sections were of H-40 steel, 12 of J-55, and 12 of N-80. As of this writing there was no indication whatsoever that the defects were having any influence on the rate of corrosion. All were corroding very rapidly, but no more rapidly in or near the defects than in any other area of the specimens. In fact, in many cases, the defects were disappearing because of more rapid corrosion of the nondefective areas.

Coupled vs. Plain-End Testing

Right now there is considerable debate, in A.P.I. specification meetings, as to whether casing or tubing should be pressure tested plain end, before upsetting and/or threading, or after threading and with couplings screwed on. The argument in favor of testing with the couplings in place is that the tube would not only be tested as to its resistance to bursting but also as to the resistance of the threads to leakage.

The objection to this latter reasoning is twofold: first, that only one end of the tube's threads are being tested, the other end being not yet made up as it will be in a well; and, second, that the time element of the test is too short. A threaded connection which will not leak in 5 seconds may leak after 1 minute. One that does not leak in 1 minute may leak in an hour, and so on.

Also, threaded connections which may not leak at all with water as the testing fluid may leak with oil. One which may not leak with oil may leak with gas.

Above all, why test just one end of a tube and trust that the other end will not leak when it is made up with its mating thread, in the well? It would be much more logical, in the writer's opinion, to test the body of the pipe and check the threads against the specifications so painstakingly set up by the present A.P.I. specifications.

It has long been established that threads cut within tolerance in all elements when screwed up power tight with a proper lubricant temporarily will resist internal pressures up to the bursting strength of the body of the pipe. How long they will remain leakproof is a function of the nature of the testing fluid, and of time, and neither of these factors is being checked by either a mill or field hydrostatic test. **And, again, the field end thread is not being checked at all with its eventual mating thread.**

The only valid argument in favor of testing casing and tubing with the couplings in place is that the couplings themselves would thus be tested in hoop tension. How much this would be worth is debatable, but the desired result could be obtained by high-pressure testing the coupling stock itself, before being cut up (from tubes) and threaded. At this time most United States pipe mills are equipping themselves to be able to test pipe either with or without the couplings screwed on and let the future decide whether the former method is worth while.

In this connection, the idea is slowly gaining favor of high-pressure testing casing **in the well**, after cementing and before drilling out the cement plug. For example, an operating company in Wyoming is regularly having its casing tested to 80 per cent of the minimum yield at the mill, or on location, and then testing the string in the well to 6,000 psi. and holding this pressure for 30 minutes. These are 13,000-ft. wells and the slight cost of this final test is only a very small fraction of total casing cost and is more than justified by the peace of mind of the operating department while the well is being drilled in and placed on production.

Tubing, too, is very commonly being tested, in place, to pressures appreciably in excess of the expected top hole, shut-in pressure. Because of such practice the writer has seen a number of examples of lengths which failed in light plug scores which might later have failed after the well was on production.

Conclusions

Lengths of casing and tubing may and occasionally do contain defects no matter by what process they were made nor what the grade of steel might be. Some of the defects may readily be seen and are cataloged as seams, pits, blisters, plug scores, etc., but their effect on performance properties cannot possibly be determined by visual inspection nor by determination of their dimensions.

Other physical defects not readily detected by ordinary visual inspection may be found by the use of special means, such as microscopic or electromagnetic inspection equipment. Examples of these are rolled-in high mill fins, sharp-bottomed plug scores, and hairline cracks produced by cold straightening. Their effect on performance properties are much more intense than the more visible defects.

Still other defects, such as improper metallurgical treatment or accidental water quenching, cannot be found by any nondestructive test. These are usually the most fatal of all.

Defective tubes could be eliminated by any testing method that subjected the entire tube to stresses near the yield point of the metal, such as full-length tension testing, collapse testing, or internal-pressure testing. Only one of these is economically feasible—pressure testing. It, fortunately, is relatively inexpensive and can be applied to each separate length. Also, fortunately, internal-pressure testing applies a stress in the direction of lowest physical properties, thus giving great assurance that lengths which pass this test would pass tension or collapse tests of comparable intensity.

Therefore, since resistance to failure is the prime requisite of a tubular section it is only logical to **proof test it rather than merely to inspect it.** To the writer it seems utterly absurd to reject a tube because of a surface imperfection, which has an immeasurably small effect on performance value, and then accept another tube free from visible imperfections which might fail on a pressure test of only one-half or one-third of the yield point strength. This is truly "straining at gnats and swallowing camels."

In the opinion of the writer Paragraph 40 of the sixteenth edition of A.P.I. STD 5A should be reworded so as to better define "Injurious Defects." Instead of a limiting depth the defects should be evaluated by their ability to withstand an internal hydrostatic pressure of a stated amount. This would give a practical and reasonable answer to the eternal controversy between the manufacturer and the user as to what constitutes an injurious defect.

As a final suggestion, all pressure tests should be held for at least 5 seconds and the tube should be subjected to air-hammer blows during the test period. Hammering would furnish a shock load and dislodge any deeply imbedded slugs of metal which might be just on the point of giving way. A very deep seam, as another example, might withstand a heavy static load but tear open under a shock load. The time element is not important, but the 5-second interval is to insure that the required pressure was actually reached.

Bibliography

1. Thompson, A. W., and Texter, H. G., "Field Test on Rejected Drill Pipe," A.P.I. Drilling and Production Practice (1948), page 87.

2. Frame, W. M., "Casing Setting Depths Are not Assured by Physical Properties of the Steel," A.P.I. Drilling and Production Practice (1938), page 322.

3. Kettenburg, Robert J., and Schmieder, Freemont R., "Oil-Well Casing Failures," A.P.I. Drilling and Production Practice (1945), page 185.

4. Wais, Jr., John, "Recent Developments in Casing Standards and Design," A.P.I. Drilling and Production Practice (1947) page 249.

QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Decoking Pipe Still Tubes by The Steam-Air Method

In a recent article in The Oil and Gas Journal, reference was made to the decoking of furnace tubes by the steam-air process. I have also seen references in the decoking of furnace tubes by burning with oxygen. Could you furnish any information regarding these processes?—J. L. S.

This method of removing coke created much interest in 1933-1936 but not much has been written about the operation since that time. The coke formed at exceedingly high temperatures is sometimes so hard that regular mechanical cleaning methods are not very satisfactory.

The operation is basically simple but in practice it requires close attention because overheating of the tubes can cause them to lose their heat treatment or to be badly scaled by high-temperature oxidation. The furnace is fired to a temperature of about 1,000° F., and then the temperature is gradually raised to 1,100° F. or higher. Meanwhile, air is passed through the tubes and the coke begins to burn at about 950° F. As the temperature approaches 1,100° F., it is necessary to introduce steam with the air to avoid overheating, and a temperature higher than 1,100° F. in the tube metal will usually cause loss of temper or change of microstructure in the steel. The progress of the burning can be traced by watching the red hot spot move along the tube. Should the spot become a dull cherry red, the steam should be increased to slow down the combustion. Burning is also indicated by sparks flying out of the tube. It is customary to burn one section of tubes at a time and the steam and gas is exhausted from each section before starting with the next section of tubes.

The method cannot be applied to the convection section of a still because the tubes cannot be seen during the burning operation. Of course, in small or experimental furnaces the convection section or coil can be removed from the furnace setting.

In another, less-popular method, the tubes are unheaded and a burner is passed slowly through the tube. A ring burner is mounted on the end of a small pipe or tube so that the flame is directed outward against the tube wall. This is said to cause the coke to crack off. Propane gas or acetylene may be used as a fuel. It is necessary to polish the tube by wire brushing.

Only one recent reference is available, i.e., "Decoking Heater Tubes with Steam, Air Saves Time. . . ." Petroleum Processing, August 7, 1946, page R-577 and the method described in this reference is summarized on page 604 of the third edition of Petroleum Refinery Engineering (McGraw-Hill Book Co., Inc., New York).

Dry Point Versus End Point

What is meant by the "dry point" and how is it related to the "end point"?—S. M. J.

Although the term dry point probably has no formal definition, it is generally considered to be the temperature registered on the thermometer during an A.S.T.M. distillation at the moment that the bottom of the flash becomes dry. After the dry point, the temperature continues to rise, finally attaining a maximum temperature called the end point.

With narrow-boiling-range samples or pure materials, the dry point is much lower than the end point, and vice versa, but the relationship as indicated in Table 1 and Fig. 1 here is not exact. It is obvious that more experimental data are needed, and that A.S.T.M. temperatures cannot be duplicated with precision.

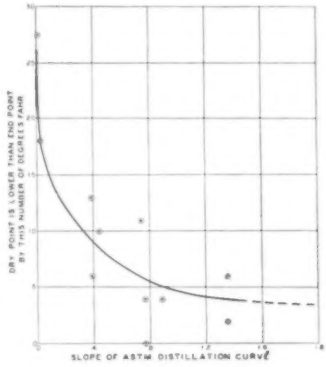


Fig. 1—Approximate relation of A.S.T.M. end point and the so-called dry point.

Effect of End Point on Octane Number

Are we correct in assuming that the octane number of high-end-point gasolines is always lower than the octane number of low-end-point gasolines?—W. M. T.

High-end-point gasolines generally have lower octane numbers but there is one exception, namely, catalytic reformed gasoline. The data of Table 1 show the general relationship (Holaday and Heath, Motor Fuel Volatility Trends, S.A.E. Quarterly Trans., July 1951, page 429). It is obvious in the tabulation that the newer catalytic processes are tending to eliminate the effect of end point (or 90 per cent point) on octane number, and to encourage the use of higher-boiling less-volatile fuels.

Much the same sort of a relationship is indicated in Table 2 for another crude oil. The two sets of values are very much alike (Tables 1 and 2) but many crude oils are encountered in which the straightrun gasoline has a quite different octane number-yield curve.

TABLE 1—EFFECT OF 90 PER CENT POINT ON RESEARCH OCTANE NUMBER

A.S.T.M. 90% pt.	Strt. run	Ther. crk'd.	Ther. refd.	Cat'ic. refd.	Cat'ic. crk'd
240	77				
280	71	83	83	87	90
320	64	81	82	88	90
360	57	77	79	89	90
400	49	73	77	90	90
440		70			89

TABLE 2—OCTANE NUMBERS (M.M.) OF GASOLINES MADE FROM ONE CRUDE OIL

Mid Boiling point	Straight-run	Thermal cracking	Catalytic cracking
125° F	72	80	80
150° F	69	78	79
175° F.	64.5	76	79
200° F.	60	74	78
225° F.	56	72	78
250° F.	52.5	70.2	77.5

TABLE 1—RELATIONSHIP OF END POINT AND DRY POINT

Material—	A.P.I.	I.B.P.	10	50	90	E.P.	Dry point	Slope
Benzene		173	174	174	175	200	175	0.01
Toluene		227	228	229	229	247	229	0.02
Naphtha (side-draw)	47.9	300	312	323	343	369	356-363*	0.39
Unstripped naphtha	48.4	287	307	321	342	360	350	0.44
Gas oil	34.5	473	486	514	545	580	569	0.74
Kerosine	40.8	365	387	412	449	473	469-473*	0.77
Unstripped kerosine	41.4	356	376	409	447	474	470	0.89
Light naphtha	61.1	110	176	235	284	308	302-306*	1.35

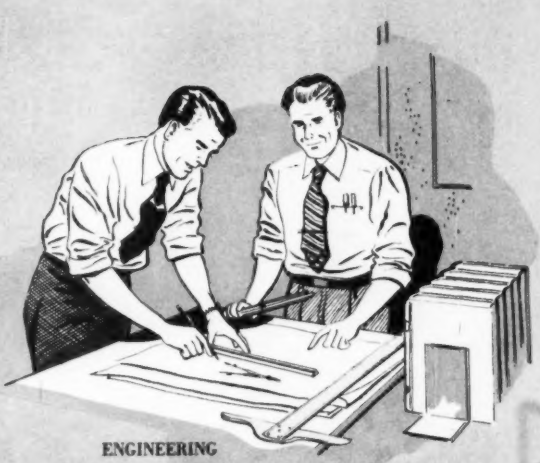
*Several samples tested.

Helpful information

Consultation on engineering problems and technical literature covering every phase of pump operation and efficiency is...

YOURS FOR THE ASKING

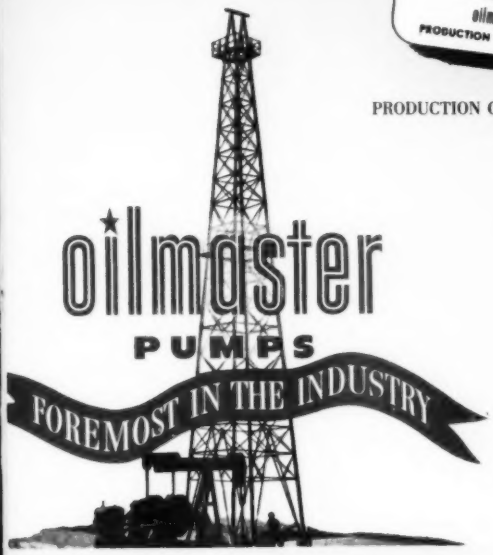
PRODUCTION HANDBOOK



ENGINEERING CONSULTATION

PRODUCTION CALCULATOR

INDIVIDUAL PUMP BULLETINS

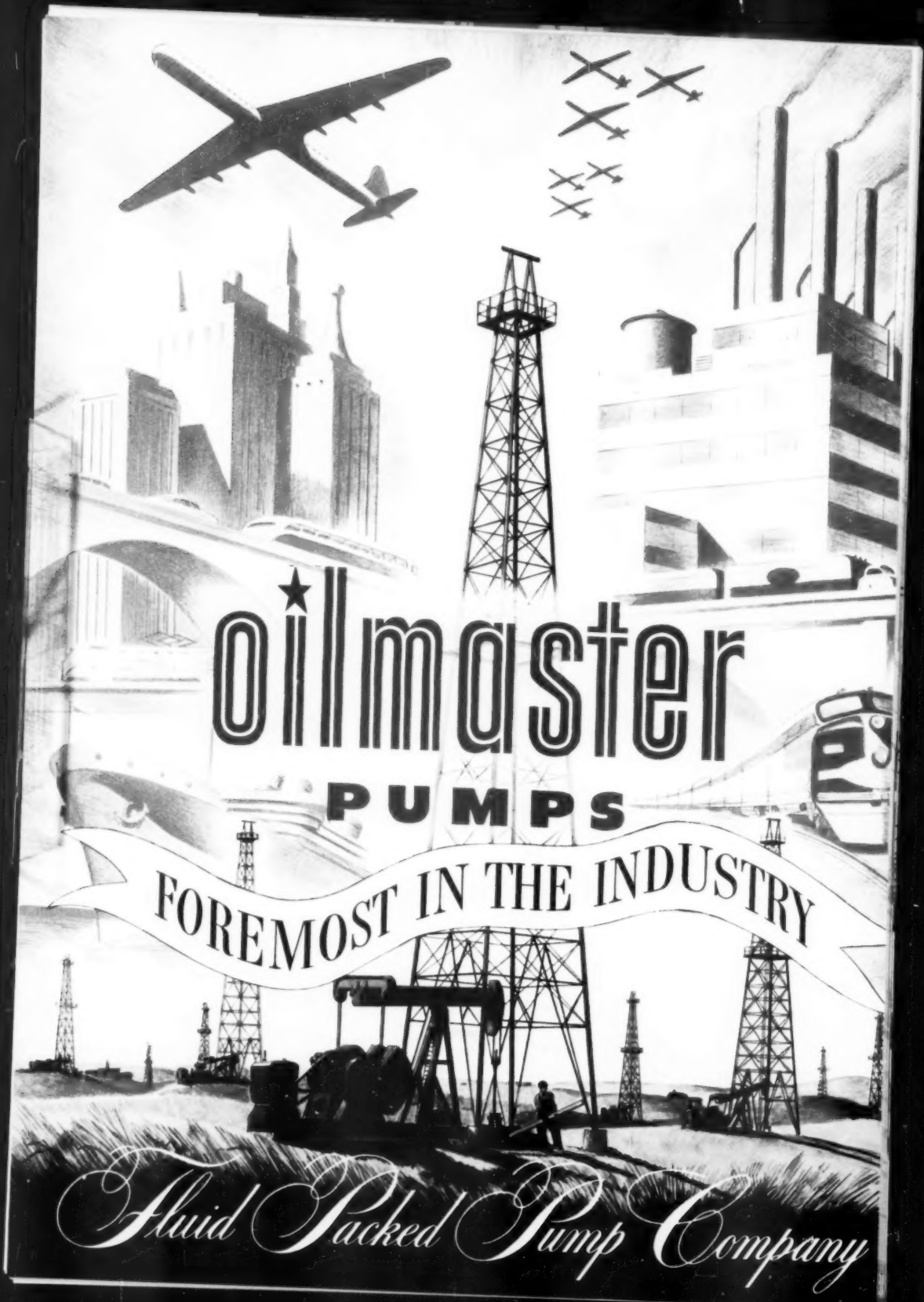


Main Office and Plant, Los Nietos, Calif.

Distributed by The National Supply Co. Export: National Supply Export Corp., 600 Fifth Avenue, New York

Co-Distributors: Berry Supply Store, Beacon Supply Co., Industrial Supply Co.

Fluid Packed Pump Company


oilmaster
PUMPS
FOREMOST IN THE INDUSTRY
Fluid Packed Pump Company

CORROSION and its control

Low-Temperature Hydrogen Attack of Steel

A MATTER of growing concern to refinery operators is the prevalence of failure to steel piping and vessels due to the penetration of hydrogen into the steel itself. There seems to be two separate types of this attack, associated respectively with low and high-temperature ranges. The low-temperature attack takes the form of blistering, cracking, or loss of ductility. It is capricious in nature, and recent investigations[1] indicate that it is much more prevalent than had formerly been supposed. Very careful inspection may fail to disclose the presence of this type of corrosion—for it is increasingly clear that it is associated with, and directly resultant from, electrolytic corrosion in the presence of water.

The key to the understanding of the process is that atomic hydrogen will diffuse through steel with considerable rapidity, while molecular hydrogen has an extremely low diffusion rate. Thus when an electrolytic corrosion process releases atomic hydrogen at the surface of a steel vessel, there exists a possibility that it will diffuse into the steel. This does not always take place, and the circumstances which control the action are not completely understood. Often the chemical or catalytic environment is such that the hydrogen is either removed by combination with other elements, or combines rapidly into molecular hydrogen, in which case no attack occurs.

Failure in the Making

If the hydrogen remained in atomic form and merely diffused into the steel, the ultimate result would be the leakage through the vessel of a certain amount of hydrogen, and no damage would be done. Unfortunately, however, much of the hydrogen combines within the steel into the molecular form; since molecular hydrogen cannot diffuse through steel, it is trapped. Further combination of additional hydrogen in the same regions builds up an accumulation of gas under rising pressure. Finally the pressure becomes so great that the metal is ruptured, and a disastrous failure is in the making.

It appears that the blister type of failure is a result of conditions which lead to the formation of molecular hydrogen at a certain fairly definite depth below the original surface of the metal. Thus the accumulated gas all lies in a plane parallel to the surface, and the pressure is ultimately relieved by a rupture along this plane. The outward bulging of the layer of steel above the rupture plane then forms the characteristic blister, which may range from almost microscopic size to several inches in diameter. By the time such blisters have been formed and are detected by inspection, the particular vessel affected is damaged beyond repair, even if a total failure has not occurred.

Insidious Difficulty

Another way in which this difficulty may make itself known is even more insidious. Instead of combining along a well-defined plane, the hydrogen may accumulate at scattered discontinuities in the steel. At each focus of formation, the pressure will gradually build up as more and more gas is formed. Like any other gas pressure, that exerted by the molecular hydrogen is equal in all directions, and hence subjects the steel to a uniform stress. However, the metal is already under stress due either to the operating conditions, or to unrelieved fabricating stresses, or partly to both.

When the sum of the pressure stress and the operating stress reaches the point of failure, a small fissure occurs; the direction of this fissure is transverse to the direction of the ordinary stress in the metal; hence all the small fissures which occur in a given region will tend to lie in the same direction—and it is the very worst direction in which they could be located!

Conceivably the same sort of fissure orientation could take place even if the hydrogen formation were completely random, or localized along a plane as in the blister type of failure. In other words, whether or not fissures or blisters form is probably determined not so much by the places in which hydrogen is formed as by the distribution of stresses in the vessel.

Although prevention or mitigation of this type of attack is by no means simple or easy, the most serious problem connected with it is that of detection. As mentioned before, blistering indicated an advanced stage of the attack; the situation is even worse when it takes the form of internal fissuring, for there is no easy method of detecting this process, and disastrous failure can occur before any suspicion is aroused.

Two Methods of Detection

The writers already cited have described two methods of detection; both are time-consuming and somewhat expensive, and both tend to show that the attack is occurring, but do not indicate the extent of damage which has already been done. The first method involves welding a steel pad (by the edges) to the exterior surface of a vessel where attack is suspected. A pressure gage connected to the pad will show an increase of pressure as hydrogen collects behind the pad, after diffusing entirely through the vessel wall.

The other method — much faster, but still slow—involves inserting a probe into the vessel. The probe consists of a thin steel tube, connected to an externally situated pressure gage. In using this probe, it is necessary to make the assumption that conditions on the surface of the tube are similar to those on the interior surface of the vessel, and that the diffusion through the tube wall takes place in the same way as diffusion through the wall of the vessel. Clearly the rate of diffusion through the tube of the probe can tell nothing concerning the distribution of accumulated hydrogen within the vessel wall. The indication given by this device, then, is useful information, but still incomplete.

Reference

1. Effinger, R. T., Renquist, M. L. Wachter, A., and Wilson, J. G., "Hydrogen Attack of Steel in Refinery Equipment," Petroleum Refiner, 30:5:132, May 1951.

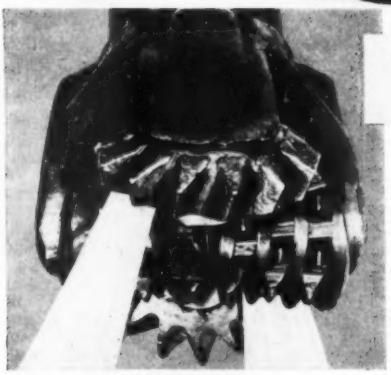
Part 41 of a series by Marshall E. Parker, consulting engineer, Houston.

G. G. (Pinky) Jordan, tool pusher for
Richardson & Bass Drilling Company, Louisiana, says...

This bit drills fast without balling up.

"I like to use **REED** "LT" Series Rock Bits for Louisiana drilling because I can make footage fast without having the bit ball up."

REED
Liquid-blast
ROCK BITS



REED LIQUID-BLAST JETTING ACTION KEEPS CUTTERS CLEAN

This photograph shows how jets of drilling fluid from the Liquid-Blast nozzle clean both the cutters and the bottom of the hole.

This action permits "crowding" the bit for fast soft-formation drilling without having formation ball up on the cutters.

REED ROLLER BIT COMPANY
HOUSTON 1, TEXAS

NEW YORK LONDON BUENOS AIRES

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

2798

Cost-imating

Costs Show Rising Tendency

THE indexes of specific construction materials shown on this page, prepared by W. L. Nelson, technical editor of The Oil and Gas Journal, may be used to bring the many costs published in the Cost-imating series (October 21, 1948 weekly through December 29, 1949) to current prices. Similar itemized cost indexes are published quarterly in the first weekly issues of January, April, July, and October. The Nelson Refinery Construction Index appears in the first weekly issue each month.

(Multiply the prices of Cost-imating series by these indexes)

Base: 1946 = 100

	1947	1948	1949	1950	Aug 1951	Reference	Complete index appears in Cost-imating
Labor:							
Skilled construction	112.0	125.0	133.9	140.0	150.1	Eng. News Record	No. 55—Nov. 3, 1949
Common labor	115.0	131.0	140.4	148.1	158.5	Eng. News Record	No. 55—Nov. 3, 1949
Refinery construction	113.5	128.0	137.1	144.0	154.3		No. 61—Dec. 15, 1949
Refinery operation	109.0	126.0	132.9	137.6	154.2	Survey of Current Business	No. 55—Nov. 3, 1949
Equipment or materials:							
Board insulation, 48-in.	112.5	125.0	125.1	129.8	136.5	Code 561	
Boiled tubes, 2-2¼-in.	115.0	†135.0	140.9	149.5	163.3	Code 409.2	
Brick and tile composite	114.0	137.0	131.4	137.1	147.2	Composite	No. 22—Mar. 17, 1949
Brick, common	110.5	127.0	133.1	138.2	147.3	Code 498.1	
Brick, fireclay	114.0	126.0	131.3	144.9	155.5	Code 499	
Building materials composite	135.5	153.0	145.8	155.4	167.9	Composite	No. 22—Mar. 17, 1949
Castings, gray iron	118.5	†139.5	†141.5	†160.0	174.7	Code 416.9	No. 46—Sept. 1, 1949
Castings, pipe	129.0	†180.0	173.8	170.9	191.0	Code 434.2	No. 46—Sept. 1, 1949
Cement	110.0	125.0	128.2	131.2	141.4	Code 509.1	No. 22—Mar. 17, 1949
Compressor	114.0	128.0	120.0	118.8	138.1	Manufacturer	No. 36—June 23, 1949
Engines (composite)	109.0	120.0	115.5	117.9	137.1	Manufacturer	No. 36—June 23, 1949
Gas	111.0	122.0	117.0	121.8	134.6	Manufacturer	No. 36—June 23, 1949
Diesel	108.0	117.0	114.0	114.0	139.7	Manufacturer	No. 36—June 23, 1949
Exchangers	†115.0	†130.0	†133.0				No. 2—Oct. 28, 1948
Instruments (composite)	113.0	120.0	123.1	127.8	142.4	Manufacturer	No. 34—June 9, 1949
Flow meter, mechanical	102.0		109.2	114.0	126.8	Manufacturer	No. 34—June 9, 1949
Flow meter, air control			132.4	138.5	157.6	Manufacturer	No. 34—June 9, 1949
Flow meter, remote			130.2	135.5	151.7	Manufacturer	No. 34—June 9, 1949
Potentiometer, 6-ft.	111.0		125.8	134.0	146.6	Manufacturer	No. 34—June 9, 1949
Potentiometer, air conjrol			131.6	134.1	136.8	Manufacturer	No. 34—June 9, 1949
Pressure controller			130.2	135.6	153.3	Manufacturer	No. 34—June 9, 1949
Pressure gage	109.0		100.0	101.2	108.6	Manufacturer	No. 34—June 9, 1949
Thermometer recording			118.6	124.0	144.3	Manufacturer	No. 34—June 9, 1949
Control valve	117.0		129.8	133.3	155.5	Manufacturer	No. 34—June 9, 1949
Insulation, asbestos pipe	118.0	122.0	130.1	137.9	162.9	Code 767	
Lumber (composite)	155.0	175.0	160.1	183.5	192.2	Composite	No. 7—Dec. 2, 1948
Cypress, C grade	155.0	178.0	213.5	†251.0	235.5	Code 529-2	
Pine, Ponderoso, No. 3	140.0	176.0	159.0	180.5	206.8	Code 524-1	
Pine, yellow timbers	138.0	161.0	154.8	†173.0	187.2	Code 522-9.1	No. 7—Dec. 2, 1948
Redwood, heart	134.0	†159.0	154.6	†181.0	191.6	Code 528-3	
Motors, electric	110.0	112.7	114.0	130.8	148.8	Manufacturer	No. 31—May 19, 1949
Paint and paint materials	137.0	135.0	127.5	119.8	133.3	Composite	No. 22—Mar. 17, 1949
Paint, inside, flat	133.5	137.0	147.0	146.5	163.1	Code 531-1	
Paint, outside	150.0	†156.0	157.0	147.0	161.0	Code 532-1	
Pipe, sewer	111.5	121.5	119.1	132.0	152.4	Code 572.1	No. 22—Mar. 17, 1949
Pipe, black, ¾-in.	130.5	†148.0	152.2	150.7	169.7	Code 435.1	No. 42—Aug. 4, 1949
Pumps (composite)	118.7	129.1	131.7	136.0	159.7	Manufacturer	No. 29—May 5, 1949
Centrifugal	109.0	120.0	118.0	128.1	136.2	Manufacturer	
Reciprocating	128.5	138.1	144.6	143.9	183.3	Manufacturer	
Sand	112.0	122.0	127.4	129.3	138.0	Code 579.2	
Steel (composite iron and steel)	121.0	140.5	150.2	155.2	168.5	Composite	No. 61—Dec. 15, 1949
Plate (tank)	117.5	†144.0	144.5	151.7	161.0	Code 446.3	No. 5—Nov. 18, 1948
Sheet, galvanized	105.0	†146.0	139.0	150.0	165.6	Code 448.3	
Structural	113.5	†145.0	151.3	162.7	172.6	Code 452.2	No. 18—Feb. 17, 1949
Transformers	116.0	116.0	116.0	116.0	130.5	Manufacturer	No. 31—May 19, 1949
Marshall-Stevens equipment (only) indexes:							
Process industries (average)	121.0	131.5	131.5	135.8	145.1	Chem. Eng., Sept. 1951	Chem. Eng., Feb. 1951
Chemical	119.5	130.0	130.0	133.8	142.8	Chem. Eng., Sept. 1951	Chem. Eng., Feb. 1951
Petroleum	121.0	132.0	132.0	136.5	145.9	Chem. Eng., Sept. 1951	Chem. Eng., Feb. 1951
Electrical power	122.0	135.0	135.0	139.3	148.7	Chem. Eng., Sept. 1951	Chem. Eng., Feb. 1951
Refrigeration	129.0	141.0	139.9	147.3	159.5	Chem. Eng., Sept. 1951	Chem. Eng., Feb. 1951
Steam power	122.0	132.0	132.0	136.6	146.8	Chem. Eng., Sept. 1951	Chem. Eng., Feb. 1951
Nelson—Refinery Construction	117.0	132.5	139.6	146.2	158.1		No. 61—Dec. 15, 1949

*The reference for all codes, or for composite, is "Wholesale Prices" published monthly by the Bureau of Labor Statistics, U. S. Department of Commerce. †Estimate

Automatic Blending

(Continued from page 71)

process units, but normally does not operate to blend Hi-speed and industrial diesel oils simultaneously.

The diesel-oil-blending unit is located adjacent to the Edeleanu SO$_2$ extraction plant which is used mainly for upgrading a virgin kerosine fraction. Excess capacity in the Edeleanu plant permits the intermittent treating of gas oil for diesel-fuel blending.

The raffinate from the gas-oil operation is then recombined in these blending facilities with a small stream of untreated gas oil to produce specification Hi-speed diesel oil. When on this operation, the diesel-oil-blending unit is in step with the Edeleanu unit. Excess untreated gas oil is transferred to separate product storage and marketed as gas-works gas oil, used for improving the yield and quality of fuel produced in domestic gas-manufacturing plants.

Engineers adopted the practice of treating a split gas-oil stream after a study of extraction efficiency. It was found that the percentage of sulfur and other undesirable compounds could be economically reduced to the required level by treating a fraction of the total gas oil and blending off with untreated stock, than by treating full diesel-oil requirements. As shown in Fig. 3, a ratio flow-controlled valve blends the proper proportion of untreated gas with total raffinate to meet specifications.

This blending unit also operates part time in step with the pipe still, blending the No. 2 sidestream from the atmospheric tower with controlled proportions of gas oil from intermediate storage to produce light industrial diesel oil. The atmospheric sidestream consists of a 400° 670° F. V.T. gas oil similar to a very heavy naphtha or light heating oil. The proportion of gas oil from storage to be blended with the continuous light gas-oil stream is controlled by a pressure-operated control valve. Similarly, excess gas oil transferred to the unit by the centrifugal pump located in the Hi-speed diesel-oil-blending unit, is moved as gas-works gas oil.

The unit is designed to blend stocks at the rates shown below:

BLENDING AND TRANSFER RATES, G.P.M.

Component	Hi-speed diesel oil	Light industrial diesel oil	Gas-works gas oil transfer
Gas oil from intermediate tanks	76	218	91-310
Edeleanu plant raffinate	318		
No. 2 atmospheric sidestream		50	
Total	394	268	

In emergencies the facilities can be operated to handle both blending operations simultaneously. However, this procedure is not desirable.

The gas-works gas-oil transfer rates are governed by the blending operations. When blending Hi-speed diesel oil only, transfer rates to gas-works oil are on the order of 310 g.p.m.; when blending light industrial oil only the rate is 167 g.p.m. and when blending both oils simultaneously, only 91 g.p.m. is transferred to product storage. While simultaneous blending is not normal, the units are sufficiently flexible to handle this operation for short periods.

On-site blending eliminates round the clock operations in central blending facilities and also allows the use of common equipment in both process and blending units. The operation is improved since unit operators can more easily observe changes in operating conditions of the units which continually provide the base stocks.

Bunker-Fuel Blending

Bunker-fuel blending is done in the pipe-still area. Residual streams from each crude-distillation unit are continuously combined with blend stock to produce a heavy fuel to a specification of 150 S.S.F. viscosity at 122° F. Flow rates of reduced crude from the atmospheric fractionator and vacuum bottoms from the two-stage unit will vary with the crudes being charged.

These heavy fractions are continuously cut back with a blend stock consisting primarily of light and heavy catalytic cycle gas oils which normally are withdrawn continuously from intermediate storage. The blend stock also includes SO$_2$ extract from gas-oil operations, rerun kerosine extract bottoms, and tar from the thermal reformer.

As shown in Fig. 4, the quantity of gas-oil blend stock to be combined with each residual fraction is automatically fixed by ratio flow controllers which are governed by flow recorders located in the tower bottoms lines upstream of the injection points. Each residual stream is blended separately to specification before combining in the transfer line to product storage.

The split gas-oil streams enter the bottoms-blending lines through elbows which point upstream. Further mixing is provided in orifices downstream from blending points. Blends in each circuit are cooled to 150° F. so that a loading temperature of 135° F. will be attained from product tankage.

A 4-in. steam traced line transfers oil to the refinery-fuel-oil system when there is a deficiency of gas. The same line also supplies blend stock for flushing the refinery-fuel-oil system. The unit has a design capacity for blending 33,000 bbl. per calendar day, with residual stocks comprising about 70 per cent of finished product. The system is completely flexible.

In providing automatic blending facilities for compounding and transferring to storage over 80 per cent of the refinery's production, design engineers have effected marked savings in investment and scarce steel materials. As a result, Fawley operates smoothly on a minimum of intermediate or process tankage capacity.

Pipe-Line Scraper Traps

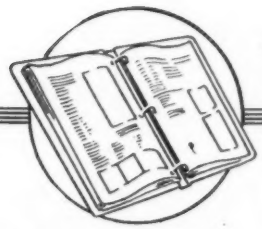
(Continued from page 74)

manufacturers could justify large valves. So smaller valve bodies were equipped with large flanges. A variety of fittings were installed, including siphons, drips, and orifice fittings. Barrel or ladder-type drips were even installed with baffles in the lines to deflect liquids down into the barrels. Vertical reservoir drips, scrubbers, and strainers have been located in points where scraper running would now be desirable. Multiple lines and discontinuity of pipe sizes also interfere with scraper running.

Early scraper methods.—The original cleaning on older lines, if any, was done in sections. The line was parted and a "pup joint" as illustrated in Fig. 5 was inserted at the downstream side of the block valve. The scraper was pulled into this joint before installation and reuse of the joint for further runs was a matter of removal, reloading, and replacement. If construction had been completed, the line was also parted at the upstream side of the next block valve. The open end of the line was either blocked up at an angle out of the ditch or a "blow joint" was installed. Then the scraper was blown through the line sometimes at speeds as high as 70 to 100 m.p.h. bringing out great clouds of dust in a spectacular display which was moderately effective though expensive. This procedure was modified in some ways such as discharging the scraper into a pile of sandbags or timber. However, scrapers were often damaged by this practice.

A great improvement in this operation came with the use of a slotted-type blow joint. This pipe is slotted longitudinally, with parallel slots equaling several times the pipe area, to let the gas escape from behind the scraper while it is still confined; thus the scraper either stops in the pipe or drops gently out of the end. The gas and dirt are exhausted through the openings. Present portable traps for this use may include refinements such as a plate with a small vent hole coupled over the end to further brake the scraper's movement.

Another variation was folding legs attached to the front so that the loosely coupled blow joint simply drops off the end of the pipe when the scraper arrives. For coupled lines, joints as shown in Fig. 6 have been made in a curved line to guide the scraper up out of the ditch. A blind straight pipe is sometimes coupled into the line in place of a removed joint. These devices promote safety.



THE REFINER'S notebook

No. 104

Orifice Turbine Governors

by J. A. Pellettere*

IN Fig. 1 of Installment No. 103 of The Refiner's Notebook four types of flyball governors were shown. Some operating features of these mechanisms were noted. Reference was made to the turn-down range of flyball governors.

Orifice governors.—In general, when the customer specifies a wide turn-down range without specifying a close degree of regulation, the manufacturer will quote on a hydraulic unit known as an *orifice governor*. Such a governor is sketched in Fig. 1 of this installment, Type 1, and shows a primary element which differs from a flyball. The primary element here consists of some form of hydron mechanism which operates the transmitting lever to the steam valve either directly or through a relay. In the Type 1 sketch on this page the hydron is shown directly coupled to the steam valve positioning lever and is basically the same type of unit offered by several manufacturers.

*Gulf Oil Corp. Portion of paper presented at 1951 I.S.A. meeting, Houston.

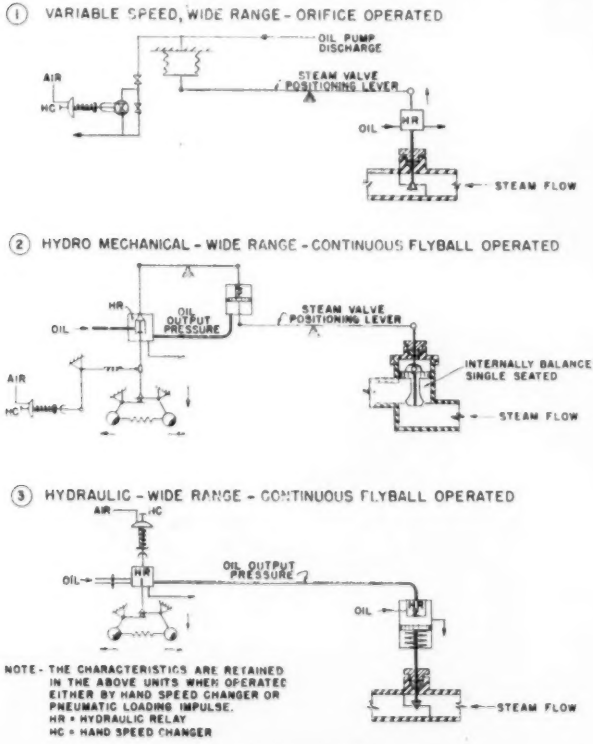


Fig. 1—Types of commercial governors.

Operation.—With the governor on manual control, the oil discharge valve from the primary element is adjusted to change the back pressure in the hydron. With the hand valve set, an increase in speed will automatically raise the pressure in the hydron, causing the steam valve to be moved toward the closed position. The pneumatic modulator consists of a small diaphragm-operated valve in the oil line leaving the hydron.

Air-pressure changes modify the outlet orifice from the hydron in such a manner that the oil pressure is changed in the hydron, controlling the speed in accordance with demands from the primary pneumatic instrument. This is a pneumatic setting of speed similar to that accomplished by the hydro-mechanical flyball unit, Type 4, shown in Fig. 1 of Installment No. 103.

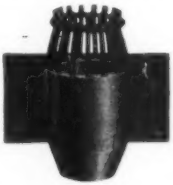
Characteristics.—In the orifice governor it is possible to have the hydron position the lever, which in turn positions an internally balanced steam valve without the oil-operated servomotor. This can be construed as a hydraulic governor with no true oil relay present. As mentioned before, the definition of relay is rather vague. One thinks of a relay as a mechanism wherein a "flea powered" circuit releases a high-energy circuit to do work. In general, if the manufacturer supplies a governor with an oil "squirting" mechanism, it is construed by the trade to be an oil-relay-type governor. The average customer believes that an oil-relay governor implies that the steam valve will be oil-power positioned.

Some points of interest with regard to the orifice governor are: (1) it is not easy to get a linear response of speed to air impulses, (2) regulation is not as good as with a flyball type of governor, (3) it is cheaper than the hydraulic flyball governor or the so-called constant-speed hydraulic governor, (4) it is usually operated on hand speed changer and/or air impulses in its entirety with no preemergency features, (5) the orifice governors offer a large turn-down ratio, and (6) steam valve requires shop characterization to match load points of driven unit.

4 types of GUIBERSON SWAB CUPS

TYPE "J" cup lifts heaviest loads from wells of any depth. In the *yellow* box!

TYPE "L" Cup performs superbly on medium and light fluid loads in wells of any depth. Buy the pair in the *blue* box!



TYPE "GW" Cup is a special purpose cup that's tops for running in rough tubing —getting the last cupful of fluid in shallow wells. In the *green* box!

TYPE "K" Tubing Swab cup is a low-priced general purpose swab cup for depths up to 6000 feet. In the *red* box!

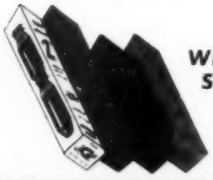
LIFT ANY LOAD FROM ANY DEPTH

and do it in record time!

Fast-falling Guiberson Tubing Swabs, with compact, one-piece mandrel and any of *four* types of Guiberson Tubing Swab Cups... give unexcelled performance in lifting *any* load from *any* depth.

All Guiberson cups have flexible lips that insure good wall contact in lifting the load... pass collar gaps smoothly without loss of fluid.

For deep wells, shallow wells, or medium wells... for heavy, medium or light loads... for smooth or rough tubing— Guiberson offers the widest range of cup types and sizes on the market today!



WHATEVER YOUR SWABBING PROBLEM
there's a Guiberson Cup that answers it!

Write today for descriptive swab pamphlet

THE
GUIBERSON
CORPORATION
ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.
Sold By Leading Oil Field Supply Stores Everywhere

Flooding Patterns

IN the final analysis, the only control which an operator may exercise over a reservoir is the withdrawal or injection of fluids. This may be considered in two parts—the types of fluids and the positions in the reservoir at which they are withdrawn or injected. A discussion of the latter evolves into a discussion of well spacing, not particularly of well density but of pattern of wells.

The position of one well in a reservoir relative to another determines the flow paths taken by the fluids as they pass through the reservoir rock. This becomes particularly important when injected fluid must be used to move the produced fluids to the production well. If the fluid paths are not controllable then a portion of production may be lost. Principles have been developed to guide the operator in selecting the proper positioning of injection wells relative to production wells. A good many such principles are economic and apply to the specific conditions of a given area.

A major consideration in determining relative position of injection wells to production wells must be geologic environment. In a uniform reservoir of high permeability, the decision may be one of fluid injection and withdrawal to promote segregation of fluids. Should a reservoir be low in permeability and heterogeneous, the decision may be one of placing injection wells so that the maximum reservoir coverage of injected fluid would be obtained in the appropriate time interval. These are two extreme situations. It is to the latter of the two that the intensive flooding pattern is most adaptable and of importance.

Ideally, the advance of a flood would be as a plane, whether in a horizontal plane due to gravitational segregating forces, or in a vertical plane. The vertical planar advance from one end of a reservoir to the other cannot be achieved practically because access of the injected fluids to the reservoir rock does not occur over an entire vertical plane of the reservoir but only through wells lying in the plane, unless an infinite number of wells could be drilled. However, the effect of a vertical planar advance can be achieved through a limited number of wells drilled in the same vertical plane provided the distance to be flooded is large. This, however, requires long times for complete reservoir coverage by the injected fluid, particularly in low-permeability material. The practical patterns of injection wells relative to production wells are, therefore, compromises between the achievement of a complete planar advance and a short enough time for procuring economic flooding results.

Flood patterns have evolved to a few basic types. The nearest approach to realizing a complete vertical planar advance is a direct line drive, the modifier indicating that production wells offset injection wells directly. This is shown in Fig. 1. The degree to which this pattern approaches complete planar advance depends on how far distant the injection wells are from the production wells compared to how far the production wells are from each other. A modification of the pattern is the staggered line drive indicating, as shown in Fig. 2, that production wells are diagonally offset from injection wells. Again, the degree to which the flood advance in this type pattern approaches that of a complete vertical planar advance will depend on the distance between like wells compared to the distance between unlike wells.

The five-spot pattern is a special case of the staggered line drive in which the distance between all like wells is made constant. Any four injection wells thus form a square with a production well at the center, as shown in Fig. 3.

Two other simple patterns are the four spot and seven spot. Each derives its name from the arrangement of injection wells. A four spot is three injection wells surrounding a production well; a seven spot is six injection wells surrounding a production well. Both patterns are based on the equilateral triangle and one can be converted to the other by reversing the role played by the wells. This is illustrated in Fig. 4. It is thus seen that, so far as fluid conductivity is concerned, reversing the role of wells makes no change. A reversal is analogous to reversing inlet and outflow ends of a pipe.

A flood pattern not often mentioned[1] is the nine spot which consists of eight injection wells surrounding one production well as shown in Fig. 5.

Other characteristics of these flooding patterns will be discussed later.

Reference

1. Muskat, The Theory of Nine-Spot Flooding Networks, Producers Monthly, Vol. 12, No. 5, March 1948.

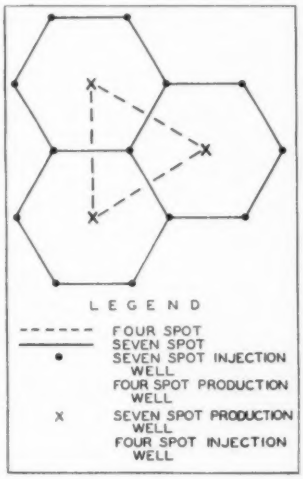


Fig. 4

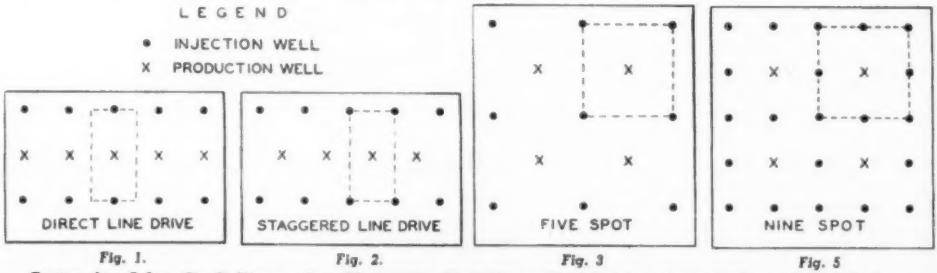


Fig. 1. *Fig. 2.* *Fig. 3* *Fig. 5*

Series by John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College

To All Rotary Hose Purchasers:

BE SURE THE HOSE YOU BUY...

...CAN BE REPAIRED!

COUPLING – The original Barney Coupling is the only coupling that is stronger than the hose itself. It is the only coupling that can be reset to save your hose from the scrap heap.

CORD CONSTRUCTION – Goodall's flexible cord design provides the extra strength to withstand torsional twist . . . thus eliminating the cause of more than 90% of rotary hose failures.

FLEXIBILITY – Goodall Long-Life can be coiled into a convenient unit for transporting without slightest damage.

PERFECT BALANCE – The Goodall method of winding the multiple cords of the carcass and the steel cables of the pressure element at corresponding angles assures perfect balance.

GREATER STRENGTH – By actual test, Goodall Long-Life is the strongest hose ever built and it retains its strength better than any other hose.

REPAIR SERVICE – Goodall Rubber Company is the only rotary hose manufacturer that can protect your investment with a maintenance plan. Goodall maintenance provides a repair department in Houston where any length of Long-Life that meets with an accident can be renewed for the rest of its normal life. No length of Long-Life repaired in our shop has ever failed in service.

SALVAGE VALUE – Substantial allowances are made on every set of Barney couplings returned.

NO PREMIUM PRICE – The extra quality, longlife and high salvage value of Goodall Flexible Cord costs no more than ordinary rotary hose.

...and that means GOODALL LONG-LIFE with the Built-in Barney Coupling

There is no end to the service you can get from Goodall Long-Life Rotary Hose. First, maximum initial life is assured by the Goodall design which has proved the strongest, most flexible rotary hose ever built. But if your Goodall rotary hose should meet with an accident, the Barney Coupling can be reset to make your hose as good as new for the rest of its normal life. So . . . instead of being scrapped . . . your Goodall Rotary Hose can be back on your rig in a hurry for thousands of extra feet of tough drilling.

That's why we say to all Goodall Rotary Hose owners: NEVER DISCARD A GOODALL ROTARY HOSE UNTIL YOU CONTACT US. And that's why we suggest to all rotary hose users: BE SURE THE HOSE YOU BUY CAN BE REPAIRED. Thanks. Barney.

GOODALL RUBBER COMPANY

TRENTON, N. J.

GOODALL RUBBER COMPANY OF TEXAS: Houston, Texas.
GOODALL RUBBER COMPANY OF CALIFORNIA: San Francisco, Los Angeles, Seattle, Salt Lake City, Portland.
GOODALL RUBBER COMPANY: New York, Philadelphia, Pittsburg, Chicago, Denver, St. Paul, Detroit.
EXPORT: Goodall Rubber Company, Trenton, N. J.
DISTRIBUTORS: Texas and Louisiana – Houston Oil Field Material Co.; Wilson Supply Co.
Oklahoma – Iverson Supply Co.

GOODALL HAS BEEN FIRST WITH EVERY WORTHWHILE ROTARY HOSE DEVELOPMENT

OIL AND GAS EQUIPMENT Digest — IT'S NEW — CHECK IT

TRADE LITERATURE

1 CONDU-THERM CO_2 RECORDER is an 11-page bulletin which gives a detailed explanation of the operation of analyzing and recording sections; a completely illustrated discussion of component parts and features, and drawings and information on gas sampling system. *Hays Corp.*

2 LINE TYPE PURIFIER for installation on compressed air, gas, vapor, and steam lines is the latest component in a series of purifiers designed for better and more efficient removal of entrainment, which has many applications throughout the chemical, petroleum, and metal-working industries. The unit is designed, built, and stamped to A.S.M.E. code for unfired pressure vessels. *V. D. Anderson Co.*

3 NICKEL ALLOY STEEL CASTINGS IN INDUSTRY is a 32-page bulletin, with over 100 illustrations, which reports on steel cast to shape as a reliable engineering material. Advantages and recommended specifications and compositions for typical service applications are given. *International Nickel Co., Inc.*

4 BULLETIN G-1 contains cost-saving information about the uses of Ampco metal and Ampcoloy alloys in bearings, gears, cams, dies, and strips. Corrosion-resistant applications as well as physical properties and photomicrographs of the alloy are included. *Ampco Metal, Inc.*

5 HORIZONTAL-TANK CAPACITY CHART is a handy chart for quickly figuring the number of gallons of a liquid in any horizontal tank without the use of tables, formulas, or computations. It is printed on an 8½ by 11 card suitable for hanging on the wall for quick reference. *Armstrong Machine Works.*

6 METAL-STAMPING PLANT. A six-page brochure to manufacturers describes facilities of the Kelley metal-stamping and drawing plant. It discusses departments and operations, and shows sample pieces made by Kelley for southwestern manufacturers. *Kelley Manufacturing Co.*

7 PROTECTIVE COATINGS. Covering hot-application enamels, primers and coupling compounds, cold-application enamels and bituminous paints, a new 24-page booklet outlines properties, uses, containers, performance tests, and application procedure for coatings, plus field notes on application which include quantities of enamel needed for various pipe sizes. *Reilly Tar & Chemical Corp.*

8 PICKUPS and how to choose them, the answers to critical application questions regarding amplitude and accelerations, frequencies, nature of motion, and range of temperature are contained in a new technical bulletin, CEC 1503. Pickups described are widely used as primary sensing units in vibration and acceleration studies. *Consolidated Engineering Corp.*

9 HEAT PROCESSING. Bulletin S-7.2 emphasizes the increasing need for precision in heat processing that is comparable with the precision in chemical compounding, metal machining, glass forming, paper making, and textile production. Principles of

FOR MORE INFORMATION . . . . use one of these cards

Postage Will Be Paid by Addressee

No Postage Stamp Necessary if Mailed in United States

BUSINESS REPLY CARD

Permit No. 3A, 34.9 P. L. & R., Tulsa, Oklahoma

THE OIL AND GAS JOURNAL
BOX 1260
TULSA, OKLAHOMA

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Jan. 7, 1952

PLEASE PRINT

COMPANY NAME .....

STREET ADDRESS .....

CITY ..... ZONE NO. ..... STATE .....

NAME ..... TITLE .....

OIL AND GAS EQUIPMENT Digest of NEW ITEMS CHECK IT

heat application to a wide variety of solid and fluid products are illustrated and described. *Selas Corporation of America.*

10 COMBINATION PRESSURE-VACUUM VENT VALVES is a new 24-page, two-color bulletin containing complete descriptions on two models: VVFA, which includes a flame arrester element, and VVH, which does not. It is illustrated with photographs and cross-section drawings and includes 14 relieving-capacity charts, 1 for each valve size. Operating data, specifications and prices are also included. *Black, Sivalls & Bryson, Inc.*

11 POWER MOWERS AND SAWS for home, farm, and industry are described in a colorful five-page brochure. Features of each type are explained, together with illustrations. *Root Manufacturing Co., Inc.*

12 HEAT INSULATION, an eight-page publication, illustrates with graphs, tables, and drawings the numerous ways in which heat insulation is used in industrial and commercial projects for temperatures as high as 1,200° F. It also contains data on physical characteristics, recommended thicknesses, efficiencies, and other application facts. *Kaylo Div., Owens-Illinois Glass Co.*

13 F/C PNEUMATIC TRANSMITTER. This bulletin describes an instrument adapted to measurement of level, pressure, specific gravity, and differential pressures. It is the nonoverloading-type diaphragm, is extremely accurate, and is designed for high or low pressure. *Instruments, Inc.*

14 ORGANIC METHODS OF SCALE AND CORROSION CONTROL are described in a 44-page book, which also includes valuable charts and data. *D. W. Haering & Co.*

15 REVISED WATER COLUMN bulletin on steam-plant equipment covers important improvements which have been made in the flat-glass inserts used in Yarway high-pressure gages. *Yarnell-Waring Co.*

16 CHRONOFLO TELEMETERS, which makes possible the transmission of information and controls over a simple two-wire electrical circuit for unlimited distances, are discussed in an eight-page bulletin. It also lists the many features of the device, describes the operation of the transmitter and receiver, and shows photographs and diagrams to illustrate the mechanism and installations. *Builders-Providence, Inc.*

17 SELF-PRIMING MOTOR-PUMPS, suited to bulk-station purposes for pumping liquids such as gasoline, kerosine, and fuel oil, are explained and illustrated in a four-page, multicolored brochure. Selection and dimensional charts are also included. *Ingersoll-Rand.*

18 BULLETIN B-592-1 describes the successful and exacting design, construction, and performance characteristics of Hydro-Line, a vertical centrifugal multistage close-coupled process pump. *Peerless Pump Div., Food Machinery & Chemical Corp.*

19 TUBE FITTINGS. New 76-page catalog contains complete data on tube fittings and tube-to-pipe adapters, fabricating equipment, and pertinent data on engineering selection and installation, with photos, drawings, and dimensional tables. *Parker Appliance Co.*

20 HASTELLOY HIGH-STRENGTH NICKEL-BASE, CORROSION-RESISTANT ALLOYS. This booklet explains how the Hastelloy alloy C expansion joint resists hot acetic acid and chloride corrosive vapors at temperatures of 158° to 284° F. *Haynes Stellite Co.*

21 CONDENSER AND HEAT EXCHANGER TUBES is a book which discusses corrosion problems and selection of proper alloys. *Chase Brass & Copper Co.*

22 LUBRICATED PLUG VALVES are described in a catalog by means of cross-section and cut-away illustrations as well as line drawings. Data on working pressures, materials of construction, design and function, accessories, lubricants, and pressure and temperature ratings is also included. *Porter Valve Div., H. K. Porter Co., Inc.*

23 ROTARY POSITIVE GAS PUMPS are described and illustrated in a 14-page multi-colored bulletin. These units are standard in 8 to 24-in. diameter gear, with six renewable sleeve bearings. Detailed drawings and a section on gears and bearings are included. *Roots-Connersville Blower Corp.*

FOR MORE INFORMATION . . . . use one of these cards

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
41 42 43 44 45 46 47 48 49 50

For further information—without obligation—I have checked numbered circles above

Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Jan. 7, 1952

PLEASE PRINT
COMPANY NAME .....
STREET ADDRESS .....
CITY ..... **ZONE NO.** ..... **STATE** .....
NAME ..... **TITLE** .....

Postage Will Be Paid by Addressee

No Postage Stamp Necessary if Mailed in United States

BUSINESS REPLY CARD
Permit No. 3A, 34.9 P. L. & R., Tulsa, Oklahoma

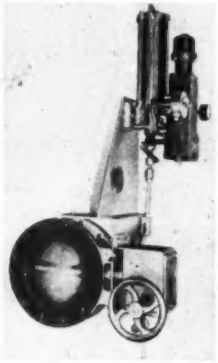
THE OIL AND GAS JOURNAL
BOX 1260
TULSA, OKLAHOMA

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

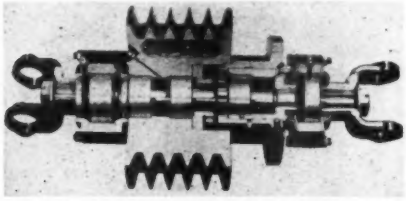
by Dan B. Miller

24 HIGH-PRESSURE RUBBER-LINED BUTTERFLY VALVES for operation and tight shutoff at high pressures. These valves range in size from 4 to 36-in. and larger. The purpose of such rubber liners is to insure tight closure, particularly at higher temperatures. The valve, body, and blade are generally of cast iron or cast steel with a steel blade. Where corrosive conditions obtain, the blade may be rubber covered or made of stainless steel. The rubber-lined steel valve shown is a 10-in. heavy-duty type suitable for operation and tight shutoff at 90-psi. pressure differential across the valve. The rubber liner is replaceable. For automatic operation it is equipped with an air cylinder controller and with remote manual control, as well as a clutch and hand-wheel control at the valve, in case of automatic controller failure. *W. S. Rockwell Co.*



IT'S NEW CHECK IT

25 DAVEY P-80, the heavy-duty new power takeoff is guaranteed to transmit full engine power to the



driving of heavy-duty truck-mounted equipment. It contains 12 fewer parts than its predecessor model, "Davey 75," and is 25 lb. lighter. Another new feature is a vacuum shift control which is offered as optional equipment. The takeoff unit itself is identical for all trucks. Carefully engineered mounting parts for individual truck makes are maintained in stock at all times. Due to design simplification, it is estimated that takeoff installation time has been reduced by 50 per cent. The P-80 is 18 in. long and weighs 140 lb. *Davey Compressor Co.*

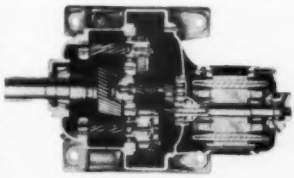
IT'S NEW CHECK IT

26 AUTRONIC CONTROLLER. A new miniature all-electronic process control unit has no moving parts, slide wires, or boosters to initiate control action. Because transmission of information throughout the system is by electrical means only, response is instantaneous. There are no connecting air lines between units to cause transmission lags. There is no significant limitation on distance of transmission. The Autronic controller incorporates functions of proportion, reset, and rate time (derivative) integrally, with the proportional band always in operation. Adjustments for the proportional band, reset rate, and rate time (derivative) are readily accessible and easily made with a pocket screwdriver. Dials are accurately calibrated with graduations clearly indicated on the face. *Swartwout Co.*

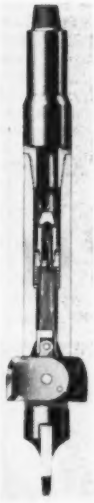
IT'S NEW CHECK IT

27 NEW TRIPLE REDUCTION GEARED MOTOR offers a high-torque, low-speed unit capable of ratios up to 175 to 1. By the use of two ordinary pinions driving the output gear, the effective torque rating is doubled. The load is distributed equally between the two pinions by a splined herringbone pinion. Consisting of

an efficient, high-speed motor with torque-multiplying, builtin gearing, the Type GM Syncrogear motor greatly reduces the amount of space necessary to house this type drive. Available in 1 to 10 hp. with speed ranges of 5 to 25 r.p.m. the Type GM possesses the features of normalized castings, asbestos-protected windings, solid centricast rotor and Lubriflush lubrication. *U. S. Electrical Motors, Inc.*



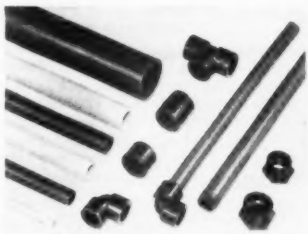
IT'S NEW CHECK IT



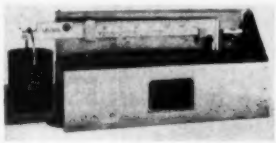
28 HYDRAULIC EXPANSION WALL SCRAPER is a well-engineered, two-bladed tool that has many important applications. It may be used to scrape the face of a producing formation and facilitate fluid flow into the hole; to open short, tight spots before running casing; to form enlarged pockets for gravel packing; and to increase the diameter of the hole at cementing points to improve the efficiency of the cement job. For directional drilling the wall scraper can be provided with a bull nose that extends well below the blade slot. This helps to stabilize the tool when in operation. A bottom-hole wall scraper with body terminating at the lower end of the blade slot is available for enlarging the last few feet of hole. The scraper blades in both tools are extended by the pressure of the circulating fluid which is controlled at the pumps by the driller. *Grant Oil Tool Co.*

IT'S NEW CHECK IT

29 NEW POLYDUR 162 PIPE. Nonplasticized PVC has proved its versatility in resisting all types of chemical attack. Polydur is a rigid, high-molecular - weight pipe remarkable in its ability to be both hard and tough at the same time. It is extruded in extra-heavy wall pipe up to and including 2 in. At temperatures below 170° F. it is capable of conducting acids, alkalies, salts, oxidizing agents, oils, greases, alcohols, gasoline, and carbon tetrachloride. It can be machined, welded, threaded and even formed by heating above 250° F. Plain-end or flange pipe can be furnished in standard lengths of 10 or 25 ft. Polydur's strength remains high even at subzero temperatures. It will not become brittle. Neither will it deteriorate with age. Its water absorption rate is low; it is completely self-extinguishing; and, it is a good dielectric. It is corrosionproof throughout, eliminating protective coatings and other costly maintenance nuisances. *Munray Products, Inc.*



30 FANN MUD BALANCE, MODEL 10. An improved accurate balance for determining the density of drilling - mud samples and other fluids operates by means of a counterweight balancing system measuring a predetermined small volume. The instrument consists of a combination case and base, a beam graduated in pounds per gallon, a hard-rubber mud-sample cup, detachable cap, slide bar, and counterweights. The complete instrument with case weighs only 2¾ lb. and dimensions are 3½ by 3½ by 12¾ in. Its range is from 7 to 21 pounds per gallon. *Geophysical Machine Works.*



IT'S NEW CHECK IT

31 A NEW SERIES OF STAINLESS-STEEL PACKING GLANDS is designed for general use and ease of installation in process control, pilot-plant, or laboratory installations. The glands available to accommodate tubes

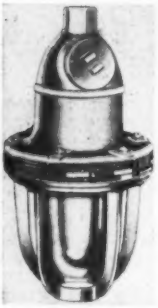
from ⅛ to 13/32 in. (⅛ in. I.P.S.) outside diameter at the present, and the company expects to increase the maximum size to ¾-in. diameter in the near future. Types PG-2 and PG-4 are furnished with asbestos graphite packing and may be used as small stuffing boxes or to seal static lines, thermocouple wells, dial-type thermometer stems, or any other round tubes or rods. Type PG-3 employs powdered talc as a sealant and is therefore chemically inert and may be used at temperatures exceeding 1,400° F. Type PG-3 cannot be used as stuffing boxes for moving parts but provide excellent pressure or vacuum seals for stationary tubes. The inside diameter of all Conax packing glands are bored to customers' specifications. All units are made of Type 303 stainless steel throughout. *Conax Corp.*

IT'S NEW CHECK IT

32 STEAM-JET CLEANER MODEL JC-25 is built to operate at pressures up to 200 psi. The combination of this high pressure and the new Twin-Jet Steam Lance, with finger-tip control, gives superjet velocity and powerful cleaning action. Only 16 in. wide and 48 in. long, JC-25 is designed for maximum portability in close quarters. The unit is completely self-contained with space provided on the all-steel truck to mount a water tank of sufficient capacity for 3 to 4 hours of continuous operation. Small quantities of solvents are used effectively and economically for they are not diluted by mixing with gallons of water at the jet. Dirt, grease, oil, and caked-on accumulations melt away before the powerful jet of hot, dry steam and solvents applied instantly as needed under finger-tip control of the operator. The

boiler water itself is the electric-resistance heating element and if there is no water, no current passes and no steam is generated. *Livingstone Engineering Co.*

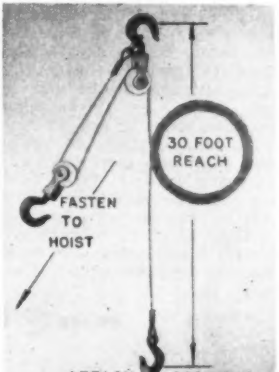
IT'S NEW CHECK IT



33 EXPLOSIONPROOF ELECTRICAL FITTINGS AND FIXTURES. Designed for hazardous locations, and particularly well suited to the numerous electrical installations necessary in the petroleum processing industries, they are made of extremely tough corrosion-resistant cast metal sprayed with high-grade lacquer. Every hub contains five full, clean threads, external or internal, to receive snugly the rigid conduit which is required by the electrical code. In addition the firm also manufactures explosionproof light fixtures, explosionproof switches, explosionproof boxes, dusttight fixtures, vaportight fixtures, entrance heads, junction fittings, unions, and die-cast Alumalloy fittings. *Killark Electric Manufacturing Co.*

IT'S NEW CHECK IT

34 LONGLIFT HOIST ACCESSORY. Lifting of pipes, motors, ducting, or construction equipment to ceilings or construction locations as high as 30 ft. is easy with this new 6-lb. accessory, normally used in conjunction with the 8½-lb. Lug-All hoist. Operation is normally from the ground. Only the 6-lb Longlift need be taken up the ladder for overhead suspension. Capacity is 750 lb., and minimum distance between hooks is 10 in. *The Lug-All Co.*

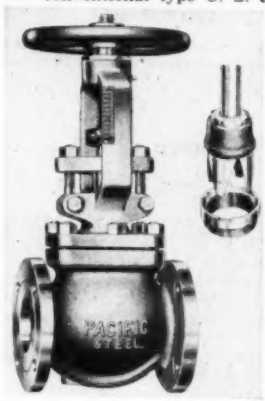


IT'S NEW CHECK IT

35 UTILITUBE is a general-purpose coiled tube made of new Alcoa aluminum alloy B50S-O. It combines low cost per foot, easy workability, and high fatigue strength among other advantages. Utilitube can be used in fuel oil, gasoline, and lubricating-oil lines for internal-combustion engines; in fuel-gas lines for heaters; also in air, vacuum, and hydraulic lines for brakes and instruments. If desired, it may be had in lengths up to 1,000 ft. or more, depending on size. In addition, it has excellent resistance to vibration and high resistance to corrosion in many exposures including industrial and sea-coast atmospheres. It improves in mechanical properties at sub-zero temperatures, even as low as minus 320° F. *Aluminum Co. of America.*

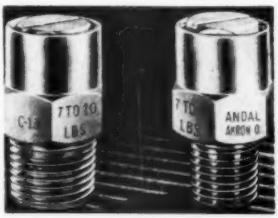
IT'S NEW CHECK IT

36 "V" PORT GLOBE VALVE for throttling service is of conventional type O. S. & Y., bolted bonnet globe valve with a special disk designed carefully to regulate the flow through four V-shaped ports. (See illustration) These valves are cast carbon steel regularly furnished with 12 per cent chromium, stainless-steel trim. An indicator is provided to accurately adjust the flow and to tell the position of the disk at a glance. They are available with flanged ends or butt welding ends in the following sizes: 150-lb. and 300-lb. Series—1½, 2, 3, 4, and 6-in. *Pacific Valves, Inc.*



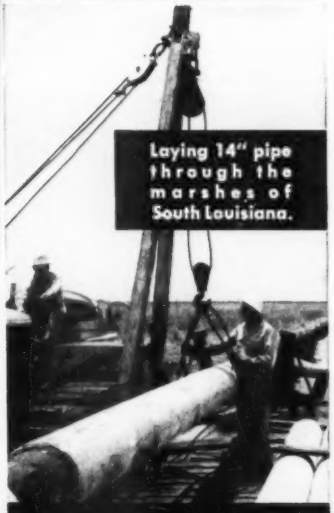
IT'S NEW CHECK IT

37 ANDAL TYPE C-13 RELIEF VALVE has been engineered to provide positive, accurate control of gases and vapors at a preset range of 7 to 10-psi. pressure. Sturdy construction, compact design, noncorrosive parts, and use of standard pipe-thread fittings make this valve readily adaptable to a wide range of applications. It has been constructed to withstand the effects of weather and other deteriorating forces, and it meets government salt-spray test standards. Valve is set to operate at pressures in 7 to 10-psi. range by means of adjusting screw located at top. Unit is available in three models having ¼-in., ⅜-in., or special pipe thread. Standard length of valve is 1 5/16 in. but special lengths can be furnished upon request. Over-all diameter is ¾ in. Special pipe threads or gasket and nut mounting can be supplied readily to specifications. Valve can be furnished in brass, steel, stainless steel, or other construction as specified. *Andrews-Alderfer Co.*



IT'S NEW CHECK IT

38 NEW TIME SWITCH MODEL. A new cord-and-plug model of T-47 general-purpose time switch is designed for easy plug-in installation and is designated T-471. The T-471 time switch automatically controls electrical circuits for one "ON" and one "OFF" operation during any 24-hour period with additional riders available. It was designed for industrial applications such as yard lighting; flood lighting; and motor, heating, and cooling controls. The T-471 has a synchronous Telechron movement and is self-starting and self-lubricated. *General Electric Co.*



PIPE LINES

Horsepower Boost

Mid-Valley nears end of big pump-station program

LONGVIEW, Tex.—Mid-Valley Pipeline Co. will complete by February 1 an expansion of pumping facilities on its system raising total horsepower from the original 18,200 hp. to 55,800 hp.

About 26,100 hp. is being installed at new stations at Stevenson, La.; Minter City, Miss.; Hornsby, Tenn.; Elkton and Simpsonville, Ky.; and Pyrmont, Ohio. The remaining 11,500 hp. of the 37,600-hp. increase will be installed at existing stations.

New pumping units will be driven by electric motors, dual-fuel engines, and diesel engines.

New stations will be equipped as follows: At Stevenson, dual-fuel engines, 3,600 hp.; Minter City, dual-fuel engines, 4,500 hp.; Hornsby, electric-motor units, 4,500 hp.; Elkton, electric-motor units, 4,500 hp.; Simpsonville, diesel-engine units, 4,500 hp.; Pyrmont, diesel-engine units, 4,500 hp.

At existing stations at Longview and Haynesville, La., Mid-Valley is adding a third dual-fuel unit and installing superchargers on the original two units to increase horsepower from 1,600 to 3,600. A third electric-motor driven unit added at Mayersville, Miss., Abbeville, Miss., and Denver, Tenn., will raise horsepower from 3,000 to 4,500 at each of the three stations. A third diesel engine added at Clarkson and Hebron, Ky., will increase horsepower from 3,000 to 4,500 at both stations.

Refinery connection. — The company has completed a 5-mile, 12-in. lateral from its 20-in. Longview-Lima, Ohio, crude trunk to Gulf Refining Co.'s Cleves refinery at Hooven, Ohio. Work was contracted by L. R. Young, Olney, Ill.

Mid-Valley has let contract to J. Ray McDermott & Co., Inc., for three Mississippi River crossing jobs. These include salvage, repair, and improvement of one of two original crossings, improvement of the other, and laying of a third crossing consisting of 3½ miles of 20 and 22-in. line.

P. G. & E.'s Big-Inch Now Carrying 400,000 M.c.f. Daily

SAN FRANCISCO.—Pacific Gas & Electric Co. placed three recently completed compressor stations in operation last week on its 500-mile big-inch gas line from Topock, Ariz., to Milpitas, Calif., boosting natural-gas deliveries to 400,000,000 cu. ft. per day.

The big 34-in. line's new capacity is 150,000,000 cu. ft. higher than its rated capacity without the added compressors. The stations were completed on schedule in time to give central and northern California needed gas supplies during peak winter months.

The stations, built at a cost of $12,000,000, are located at Topock, Hinkley, and Kettleman Hills, Calif., and are designed to boost the line pressure from 500 to 800 psi. Gas entering the line at Topock now reaches Milpitas in 42 hours, 18 less than before.

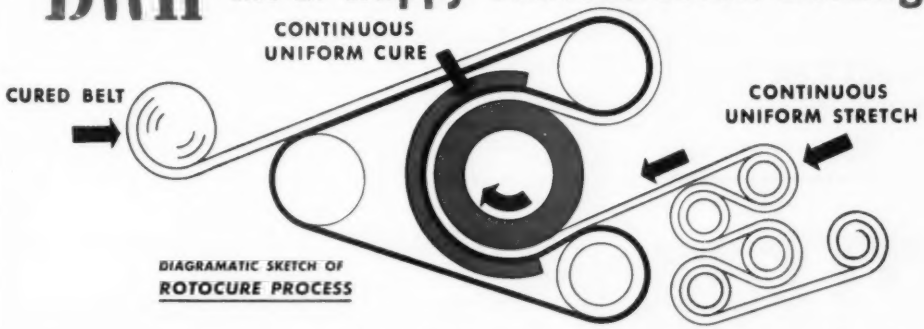
Together the stations have a total

DOWN SHE GOES.—A derrick barge holds the Staten Island end of Transcontinental Gas Pipe Line Corp.'s auxiliary line to Brooklyn in place as the 1,700-ft., 24-in. section is lowered into a trench dredged under the Arthur Kill between Gulfport, Staten Island, N. Y., and Linden, N. J. Towing the pontoon-floated section across the channel, a touchy operation due to strong currents, was accomplished in 45 minutes. A second underwater crossing, the Narrows, remains to be completed before the line enters the Bay Ridge section of Brooklyn. At some points on this crossing the line will be laid 100 ft. under the surface of the water.

ROTOCURE Eliminates this "Achilles Heel"*

* Overcured Sections which occur every 30' to 40' are a primary cause of failure in belts made by the flat press method. You won't find these "Achilles Heels" of double vulcanization in BWH Mfg. Happy Transmission & Conveyor Belting.

WITH BWH MFG. Happy Transmission Belting



DIAGRAMATIC SKETCH OF **ROTOCURE PROCESS**

Curing a small segment of rubber belting *twice* is unavoidable when belts are made under the conventional flat press method. With this "stop and go" technique, a cured segment is advanced slightly less than a press length. As vulcanization is resumed, an overcured segment results due to overlapping. This twice-cured segment is a critical section or "Achilles Heel" of about 2 to 4 inches in length and the width of the belt. It is responsible for structural weaknesses and excessive surface wear which cause early belt failure and high maintenance costs.

To solve this problem, BWH technologists pioneered the ROTOCURE process of *continuous* vulcanization whereby every *inch* of belting receives the same, *uniform* curing treatment. Here are 4 important reasons why ROTOCURE has paid off for users throughout industry, in installation after installation—by longer service life before replacement.

1. **Because there is no double vulcanization, uniform abrasion-resistant covers are always assured**
2. **A continuous vulcanization eliminates the overlaps which can reduce flex life up to 40%.**
3. **Mechanical distortion (inherent with flat press curing at the press ends) is eliminated.**
4. **Constant uniform stretch results at all times.**

As with transmission belting — so with conveyor belting, the BWH ROTOCURE process provides all these advantages plus a higher coefficient of friction because dusting agents are not required in the manufacture with ROTOCURE.

Call in Happy or write us direct for the full story of ROTOCURE and what it can do for you in keeping transmission and conveyor belts working efficiently longer — and holding belting costs down to earth.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

SERVING FOR ... 31 HAPPY YEARS

BWH Industrial Hose
Happy Coolers
Rubber Belting
Leather Belting
Bull Dog V-Belts
Sure-Grip Sheaves
P & H Engine Starters
Safety Switches
Happy Pumping Units
Power Transmission Equipment

The HAPPY COMPANY
Formerly HAPPY BELTING COMPANY
TULSA, OKLAHOMA

BRANCH STORES:
Seminole, Oklahoma — Smackover, Arkansas
Odessa, Texas — Salem, Illinois
Ellinwood, Kansas

DISTRICT REPRESENTATIVES:
Kilgore, Texas — Wichita Falls, Texas
Wichita, Kansas

capacity of 44,820 hp. The Hinkley station, 8 miles west of Barstow, Calif., is the largest with seven compressors rated at 17,500 hp. Topock has six rated at 15,000 hp., while Kettleman Hills has eight totaling 12,320 hp.

Texas Eastern Line Nears Completion to Ohio River

SHREVEPORT. — R. H. Hargrove, president of Texas Eastern Transmission Corp., said last week that it now appears that the company's big 30-in. natural-gas trunk from Kosciusko, Miss., to Connellsville, Pa., will be completed and ready for operation as far north as the first crossing of the Ohio River by early February. The seven sections of the 791-mile line south of the first crossing of the Ohio comprise about 573 miles.

Completion this far will permit deliveries of additional needed gas to the Appalachian area during the current heavy consuming season, Hargrove said.

Completion of the remaining portion of the line from the Ohio River on is scheduled by the middle of the year. All river-crossing and compressor-station construction is under way and slated to be finished early this year. Pipe-line and other construction for the Oakford underground-storage project already has been completed.

Texas Eastern expects to be ready to initiate gas deliveries to its affiliate, Algonquin Gas Transmission Co., in time to meet heavy demands next winter.

Application Deadline for Line Pipe Extended 9 Days

WASHINGTON.—Deadline for filing of Form PAD-26LP, under which operators will apply for priorities for pipe line for small construction and production operations and maintenance, repair, and operation during the second quarter of this year, has been extended by the Petroleum Administration for Defense from January 1 to January 10.

The additional time for filing was given because PAD was unable to distribute the forms until early last month.

It was also disclosed that PAD plans a minor revision of the form before third-quarter filings are due, but the present form will be acceptable for second-quarter applications.

Big Attendance Expected at 1952 P.L.C.A. Convention

HOUSTON.—Attendance at the fourth annual convention of the Pipe Line Contractors Association at the Shamrock Hotel here this week is ex-

HERE'S WHY

no other coupling costs as little to use as *FAST'S*

With Fast's Couplings you get the lowest coupling cost per year that modern engineering can provide—*because Fast's normally outlast the equipment they connect.* That means their cost can be spread out over 20 years or more!

As two users recently said:

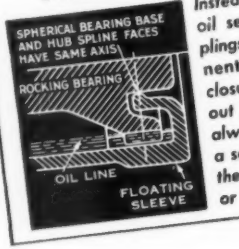
"We've had this Fast's Coupling since 1930 . . . and it's apparently going to last forever. [Wish] the other equipment caused as little trouble!" . . . "We have two Fast's Couplings . . . they are the only equipment so trouble-free we long ago forgot we had them!"

If you want lower costs, freedom from coupling shutdowns and dependable coupling engineering—specify Fast's. For complete details, mail the coupon for Fast's free catalog. Do it today!

RUGGED CONSTRUCTION:

Fast's still maintains its original design, without basic change or sacrifice in size or material. This assures you freedom from needless and expensive coupling failures.

FOOLPROOF DESIGN:



Instead of perishable oil seals, Fast's Couplings use a permanent metal-to-metal closure to keep dust out and oil in. Oil is always maintained at a safe level whether the Fast's is running or standing still.

FREE SERVICE:

When you specify Fast's Couplings you get Koppers' valuable free coupling service. If your application seems to need a special coupling, Koppers' engineers in many cases can easily modify a standard Fast's Coupling, and save you money!

MAIL COUPON TODAY FOR FREE CATALOG!

KOPPERS CO., INC., *Fast's Coupling Dept.*,
281 Scott St., Baltimore 3, Md.

Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

Name.....

Company.....

Address.....

City.....Zone.....State.....

KOPPERS

FAST'S

THE ORIGINAL GEAR-TYPE

Couplings

INDUSTRY'S STANDARD FOR 31 YEARS

pected to top all records with more than 500 persons expected.

Heading the lists of speakers for the meeting, January 8-9, will be Gardiner Symonds, president of Tennessee Gas Transmission Co., who will discuss the future of pipe-lining.

In line with a policy adopted by the board of directors of the association, no exhibits of equipment will be made.

One of the foremost problems to be tackled at the convention this year will be that of labor agreements, which will be discussed at two sessions. Pipe-line-construction practices and safety also will come in for a large share of attention.

Atlantic Seaboard to Boost Line Capacity 89,500 M.c.f.

WASHINGTON.—Atlantic Seaboard Corp. plans construction in West Virginia of four new compressor stations with a total of 18,200 hp. on its 26-in. main transmission line pending Federal Power Commission approval.

Atlantic Seaboard told the commission that more capacity is needed to meet estimated peak-day requirements during the 1952-53 winter season. The company also asked for permission to install an additional 1,100-hp. unit at an existing station in West Virginia.

Proposed facilities reportedly would furnish an 89,500,000 cu. ft. daily increase in capacity. Delivery capacity of the main at present, the company said, is estimated at 258,000,000 cu. ft. The new compressor units would cost about $8,462,000.

New stations would be built in Braxton, Upshur, Pendleton, and Hardy counties in West Virginia on Atlantic Seaboard's Cobb, W. Va.-Rockville, Md., 26-in. main line. The 1,100-hp. unit would be installed at the company's Files Creek station in Randolph County, West Virginia.

Pipe-Line Briefs

General Petroleum Corp. is preparing to increase the capacity of its 40-mile San Ardo-Estero Bay crude pipe line by about 7,000 bbl. daily through the addition of loops. Placed in operation last July the 8-in. line has a capacity of about 22,000 bbl. daily. Currently it is handling about 18,000 daily. With new producers being added at the rate of about 30 every month, additional capacity thus will soon be required.

Tennessee Gas Transmission Co. has started construction of a new compressor station on its system near Carrollton, Ohio. With the recent completion of three other new stations, new construction has raised the company's total system horsepower to 370,000.

REFINING

Conoco Plans $7,500,000 Expansion at Ponca City

PONCA CITY.—Continental Oil Co. has projected an expansion program for its refinery here which will cost in excess of $7,500,000.

Major project in the expansion will be the installation of new continuous-contact coking equipment at a cost of about $3,550,000. Another $2,000,000 will go for construction of a new lubricating-oil additives plant. In addition, Continental will install an electric-turbine generator, a high-pressure steam boiler, and auxiliary equipment for the power plant.

Construction will begin in the late spring and require about 18 months for completion.

The expansion project was announced by L. F. McCollum, Continental's president. It is the second major construction job at the Ponca City refinery since 1948 and brings to more than $15,000,000 in investment made recently in the plant. The refinery is the largest of the company's eight plants.

Du Pont Buys Site for Big Texas Petrochemical Plant

BEAUMONT.—Another big petrochemical plant on the Gulf Coast was nearer realization last week as E. I. du Pont de Nemours & Co., Inc., completed a $227,000 land transaction for another industrial site 4 miles southeast of here *(The Oil and Gas Journal, December 13, 1951, page 134)*.

Previous indications were that the proposed plant would cost in excess of $100,000,000, but company officials so far have declined to comment on what chemicals would be produced.

No immediate construction date is forecast, and an estimate has been made that ground-breaking might be 18 months away. Meanwhile, the company is negotiating for an ultimate fresh-water supply of 25,000,000 gal. daily and electrical power of 30,000 kw.

Du Pont already has three plants along the Texas coast at Orange, Victoria, and La Porte producing varied petrochemicals, chiefly intermediate products for nylon.

Midland Cooperative Studies Cushing Refinery Expansion

MINNEAPOLIS.—Engineering studies on a proposed expansion and modernization program for its Cushing, Okla., refinery have been initiated by Midland Cooperative Wholesale.

Tentative plans call for boosting crude capacity at the refinery to 10,000 bbl. per day from its present 6,000 bbl. and for installation of a catalytic cracking process.

Midland directors have authorized Universal Oil Products Co., Chicago to make the study, according to A. J. Smaby, general manager for Midland.

A source of crude to meet the increased refinery capacity has been assured, Milo Dahl, Midland production manager, said. Problems at Cushing relating to the proposed improvements are being studied by R. G.

NELSON REFINERY-CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, October.

INDEX (1946 = 100)

	1947	1948	1949	1950	Sept. 1951
Centrifugal pumps	109.0	120.0	118.9	128.1	136.2
Reciprocating pumps	128.5	138.1	144.6	143.9	183.3
Compressor	114.0	128.0	120.0	118.8	138.1
Engines	109.0	120.0	115.5	117.9	137.1
Motors	110.0	112.7	114.0	130.8	148.8
Transformers	116.0	116.0	116.0	116.0	130.5
Instruments	113.0	120.0	122.0	127.8	142.4
Miscellaneous equipment avg.	114.2	122.1	121.6	126.2	145.2
Materials component	122.4	139.3	143.6	149.5	163.8
Labor component	113.5	128.0	137.1	144.0	154.3
Refinery construction index	117.0	132.5	139.7	146.2	158.1

Bandy, general manager there, and T. B. Randall, refinery manager.

The Cushing operation is one of three petroleum-supply sources for the organization. Midland, along with two other regional cooperatives, owns Premier Petroleum Co., Longview, Tex., which has four refineries. With four other cooperatives, it owns National Cooperative Refinery Association, McPherson, Kans. National spent $4,000,000 in expansion and installation of a cat cracker which went on stream last September.

Engineering studies are scheduled to be completed by February 1, 1952.

Sunray Alkylation Unit At Duncan to Be Rebuilt

DUNCAN, Okla.—Sunray Oil Corp. has let a $1,700,000 contract to Refinery Engineering Co., Tulsa, for rebuilding and revamping of the hydrofluoric acid alkylation unit at Sunray's refinery here.

Work on the alkylation unit is a part of the company's program to revamp and more closely integrate the plant. When Sunray acquired the property the alkylation unit was shut down and largely dismantled. Processing equipment except for contactors, deisobutanizer columns, reboiler, and overhead receivers was used for other purposes on other units.

During World War II, the unit was operated on imported charge stock as a 3 contactor plant. The reworked unit will employ only 2 contactors and the company will purchase enough isobutane to balance the butylene made on the cat cracker. Production volume of alkylate will be less than during the war, but percentage yield of superior alkylates will be higher.

Principal changes include a reduction of acid - regeneration equipment and the elimination of circulating pumps in the contactors.

Growing Litharge Shortage Causing Refining Problem

WASHINGTON.—A growing shortage of litharge is creating difficulties for many refiners who use the lead oxide for sweetening purposes.

As a result of complaints of inability to secure adequate supplies, the Petroleum Administration for Defense has sent a questionnaire to refiners to get statistics and consumption prior to seeking action by the National Production Authority to increase production.

Litharge is a high-cost, low-profit product which the lead industry currently is reluctant to make because of the shortage of the base metal. Just how its output could be expanded has not been worked out and will not be considered until after figures are in showing how much additional is needed.

PAD also is continuing to have difficulty with quebracho, although reports indicate there is an adequate supply available if NPA will repeal its order limiting consumption in the drilling of oil and gas wells.

A request for repeal or revision of the order was sent to NPA some weeks ago, and last month distributors of quebracho were called in by that agency for a discussion of the situation. At that time, NPA officials were told that distributors serving the oil industry were being offered quebracho in quantities far exceeding the amount permitted to be consumed.

this isn't a new story to Us!

for 14 years operators have been using H. C. SMITH JET-ACTION BITS with great success

power jet drilling

STRAIGHT-DOWN JET ACTION is the big reason. The jet nozzles on H. C. Smith Rock Bits are so placed that the fluid jet hits the bottom of the hole, instead of washing the side. Result—faster footage, true-gauge hole, longer life for cutter teeth.

These jet-action bits have been used with outstanding results from the Gulf of Mexico to Canada—from giant offshore rigs to mast jobs in the Canadian bush.

Note: It has been found by experience that pump pressures in the range of 1300-1500 pounds produce the most satisfactory results, although pressures as low as 950 pounds are successful on small holes.

AVAILABLE IN SIZES 8⅜"-9" on 4½" A.P.I. Pi
9⅝"-15" on 6⅝" A.P.I. Pin. With various com
binations of nozzle sizes and number of nozzle

H C Smith OIL TOOL CO.

GENERAL OFFICES, EXPORT OFFICE AND PLANT: COMPTON, CALIF.

BRANCH OFFICES IN ALL PRINCIPAL OIL CENTERS IN THE UNITED ST

Among the Drilling Contractors

Decline in Active Rigs Follows Usual Trend

Another decline in the number of rotary rigs operating in the United States and western Canada was reported during the week ended December 24 (latest survey). It was reflected in nealy all regions, with increases in activity being felt only on the Gulf Coast and in the Arkansas-North Louisiana - East Texas and western Canada areas. The decrease at this time is in line with trends of previous years.

Prior to the present decline in active operations, the number of operating rigs had climbed to an all-time high of 3,181 (reported during week ended December 10). The total has been above 3,100 since the middle of November and above 3,000 since the middle of October. For the corresponding period a year ago, the number was running around 2,500, the record up to that time.

Active rigs by areas follow:

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 12-24-51	Change week ended 12-17-51	Change week ended 12-25-50
Gulf Coast	663	+22	+ 93
W. Tex.-N. M.	1,037	—16	+224
Ark.-N. La.-E. Tex.	206	+ 9	+ 38
Oklahoma	361	—18	+ 79
Kansas-S. Nebraska	189	—22	+ 25
Illinois-Eastern	129	— 5	+ 13
Rocky Mountains	179	—15	+ 60
Pacific Coast	180	— 5	+ 46
Total U. S.	2,944	—50	+578
Western Canada	172	+ 1	+ 58
Total	3,116	—49	+636

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 134 and 135.

Rine Drilling Co., Wichita, Kans., will drill a Madison lime test (approximately 3,200 ft.) for Lion Oil Co. in the Pine Lodge area, southeast of Little Buck Creek, in Niobrara County, Wyoming. Location is for 1 Hanson-Government, in the C SE SW 10-35n-63w.

G. B. Cree, Pampa, Tex., is the contractor on a wildcat test which Gulf Oil Corp. is starting 10 miles west of Miami, in Roberts County, Texas Panhandle. Location, on the operator's Haggard lease, is in Section 5, Block 2, I&GN Survey.

Baker-Price Drilling Co. has contracted with Jeff Belton and associates for two 4,000-ft. wildcat tests to be drilled in the area 14 miles southwest of Henderson, Henderson County, eastern Texas. One test, 1 Stallings, will be in the Thomas Uzzell Survey, and the other, 1 Dudley estate, in the J. W. Hamilton Survey.

Glasscock Drilling Co., Shreveport, has a projected 6,000-ft. test under way for Hassie Hunt at a wildcat location north of Fillmore, Bossier Parish, Louisiana. It is 1 Martin, in 9-18n-11w. Location is 3 miles south of the Bellvue field.

Milton Crow, Inc., Shreveport, has a rig working for Lawton Oil Corp. in the area about 3 miles southwest of the Butler field, DeSoto Parish, Louisiana. The test, 1-A Mansfield, in 3-10n-11w, has been started as a Pettit lime venture but is prepared to go to the Travis Peak around 7,500 ft. if conditions warrant.

W. C. Curry, Oil City, La., has a rig on a new location just north of the Longwood townsite in Caddo Parish where he will drill 1 Croon, in 11-18n-16w, for Richard W. Norton.

Lyons, Prentiss & McCord, Shreveport, will drill a 5,000-ft. test 2 miles southeast of Caspiana, in 30-15n-11w, Caddo Parish, Louisiana. Contract is with Isbrandtsen Co. of Louisiana. Location is on the operator's Robinson lease.

Nebraska Drillers, Inc., is drilling for Gulf Oil Corp. at 1 Torseson, an extension test in the Kimball area, Kimball County, Nebraska. Location is in the C SW NW 23-14n-56w. This contractor has just completed hole at an extension well for the Harrison pool, in the same county, where it has been drilling for Shell Oil Co. The latter well, 1 Jacobson, C NE NE 13-12n-59w, was drilled to 7,444 ft.

Tuley & Carter Drilling Co., Evansville, Ind., has a rig on contract to Frontier Refining Co. for a wildcat test in the Eagles Nest area, west of Masters, in southeastern Weld County, Colorado. The test is on the operator's Krause-Littler lease in the SE SE SW 28-4n-62w.

Balderson Drilling Co. is starting the first of two Dakota exploratory tests it has contracted to drill for Ed Fisher and Claude Stout in southern Morrill County, Nebraska. Present operation is 1 Marion, in the NW SW NW 35-18n-50w. The area is about 5 miles south of Alden and about the

same distance northwest of the Dalton pool, in northern Cheyenne County.

Cooper-Herring Drilling Co., Tyler, Tex., has moved in to drill on a contract with American-Liberty Oil Co. and Ralph Spence for a 6,500-ft. test 7 miles southeast of Oakwood, in the Alfred Penn Survey, Leon County, eastern Texas. Location is for 1 Leon Ranch.

Crescent Drilling Co., Inc., Monroe, La., has a 9,500-ft. job under way for Southwest Gas Producing Co., Inc., at a wildcat location 1½ miles north of Cedarton, Lincoln Parish, Louisiana. Location is on the operator's Shadow lease, 4 miles northeast of the Ruston field.

Warren - Bradshaw Drilling Co., Tulsa, is making hole on a projected 8,000-ft. wildcat test being drilled for The Texas Co. 13 miles southwest of Spearman, in Hutchinson County, in the Texas Panhandle. Location is on the Holt lease in Section 52, Block 5-T, T&NO Survey.

Gardner Brothers Drilling Co., Aztec, N. M., has a rig working for Southern Union Gas Co. on a wildcat location in southern LaPlata County, southwestern Colorado, near the New Mexico line. Location is for 1 Ute, NW SE SW 15-32n-11w.

Williams-Copeland, Inc., Tulsa, is making good time on the wildcat test it is drilling for Shell Oil Co. in Corson County, South Dakota. The test, 1 J. K. Winter, C NW SW 11-22n-19e, at latest report was drilling below 2,500 ft.

Loffland Brothers Co., Tulsa, has a rig running on a 9,500-ft. test it has contracted to drill for Gulf Oil Corp. in the Biddle area, in southeastern Powder River County, in southeastern Montana. This operation is carried as 1 Boyle, C NE SW 4-8s-52e.

Navajo Drilling Co. is starting a projected 5,000-ft. test for Pure Oil Co. on the latter's unitized block in the San Miquel area, near Redvale, in southern Montrose County, southwestern Colorado. Location is in the NW NE SE 24-46n-14w.

M. J. Delaney Co., Dallas, has a heavy-duty rig working for Cities Service Oil Co. in the Chapel Hill field, southeast of Chapel Hill, Smith County, eastern Texas. Present operation, just started, is 1 White, in the John Long Survey.

Delta Drilling Co., Tyler, Tex., is moving a rig to a wildcat location east of the Red Wash field in Uintah County, Utah, where it will drill for Mid - Continent Petroleum Co. at 1 Government, in 32-1s-25e.

NATURAL GAS

Gas Deficit

State, industries predict shortage over California

LOS ANGELES. — Predictions continue to crop up that California is in for a shortage of natural gas.

Last week the California Manufacturers Association presented its findings to the state public-utilities commission on long-range needs for natural gas and electric power.

The association said that California industries will require 30 per cent more gas in 1954 than they did last year, and this figure covers existing companies only. It makes no allowance for new plants which will without doubt be erected nor the increasing requirements of government agencies. The survey was said to be the most extensive ever undertaken in the state.

Earlier the utilities commission said that a shortage of natural gas looks very possible unless more out-of-state gas is imported. *(The Oil and Gas Journal, December 27, 1951, page 101).* Harold P. Huls, commissioner, said the commission has determined through its study that California is well along on a transition from a state with a surplus of gas to an area without.

Construction. — Meanwhile pipe-line firms and gas companies were taking steps to relieve the situation. While the manufacturers' association was releasing its findings, Pacific Gas & Electric Co., of San Francisco, announced that it had increased deliveries of gas through its 500-mile, 34-in. trunk from Topock, Ariz., to Milpitas, Calif., to 400,000,000 cu. ft. per day by placing new compressor stations in operation. *(See pipe-line page).*

Three other major pipe-line projects reinforcing the gas supply to the Los Angeles area were completed late last month by Southern California Gas Co. and Southern Counties Gas Co.

One, a 24-mile section of 30-in. line from the city into the San Fernando Valley, is the latest step in the companies' joint plan to encircle the metropolitan area with large-diameter pipe lines. It connects the pipe-line system from Texas to lines leading south from La Goleta storage field near Santa Barbara and from Ventura oil fields.

The companies also completed two 20 and 22-in. sections totaling 39 miles on their new La Goleta line to Los Angeles boosting capacity from the storage field by 100,000,000 cu. ft. per day.

Completion of these two sections, 18 and 21 miles, leaves only 13 miles of the line to be completed at a later date. Two 17-mile sections were completed late in 1949. As each of the sections was completed, it was looped into the original line built from La Goleta in 1944. The 13-mile section yet to be built will add another 100,000,000 cu. ft. daily to capacity.

Gas Revenues Climb But Profits Drop in October

WASHINGTON. — Operating revenues of natural-gas companies reporting to the Federal Power Commission increased 15.6 per cent in October compared with the same month a year ago, but net income dropped 21.3 per cent, FPC disclosed last week.

Revenues totaled $114,495,487 for the month in comparison with receipts of $99,106,380 in October 1950. For the 12 months ended October 31, revenues totaled $1,512,454,441, or 21.5 per cent higher than the $1,244,389,147 received in the 12-month period ended October 31, 1950.

Although net income for the month was down to $6,601,871 compared with $8,387,506 in October 1950, net income of $178,695,738 for the 12 months ending October 31, 1951, represented an increase of 0.9 per cent over the $177,124,357 realized in the comparable period ending October 31, 1950, the commission said.

Gas-utility operating income for October was $10,558,173, down 11.9 per cent from the $11,990,310 reported for October 1950. For the 12 months ending with October 31, 1951, gas-utility operating income was $227,220,138, an increase of 8.2 per cent over the $210,033,776 reported for the comparable period ending in October 1950.

Sales to ultimate consumers during October were 167,651,000,000 cu. ft., an increase of 8.9 per cent over October 1950.

Marketed Production Drops Slightly in Third Quarter

WASHINGTON. — Marketed production of natural gas in the third quarter declined slightly to 1,752,200 M.M.c.f. from a second-quarter total of 1,784,400 M.M.c.f., the Bureau of Mines reports.

Residential and commercial sales declined seasonally to 134,700 and 50,300 M.M.c.f. respectively from second-quarter figures of 319,700 and 96,800 M.M.c.f.

Industrial users consumed 923,300 M.M.c.f., a gain of 64,100 M.M.c.f. over the second quarter, while gas going to carbon-black plants held relatively steady at 103,000 M.M.c.f.

More than 154,900 M.M.c.f. went to underground storage, almost double the 89,600 M.M.c.f. stored in the second quarter.

Humble to Begin Producing 14 Sandy Hook Gas Wells

COLUMBIA, Miss.—The recent gas-production swap between Humble Oil & Refining Co. and Southern Natural Gas Co. *(The Oil and Gas Journal, December 20, 1951, page 369)* has enabled Humble to produce for the first time 14 shut-in gas-condensate wells in the Sandy Hook field of Marion County, Mississippi.

These wells and those in Angie field of Washington Parish, Louisiana, will be produced by Humble and the gas gathered by the company's system for delivery to Southern Natural at a central metering station. Southern Natural in turn will deliver it to United Gas Pipe Line Co.'s Mobile line. United will deliver a similar amount of gas from Gwinville field in Jefferson Davis County, Mississippi, to Southern Natural's pipe line.

Southern Natural reportedly will pay Humble 10 cents per M.c.f. for gas from Sandy Hook and Angie fields with gradual price increases in the future. Production initially from both fields is expected to be small due to the 15,000,000 cu. ft. per day capacity of United's 6-in. line.

Natural Gasoline

Oklahoma L.P.G. Shortage May Bring Appeal to State

OKLAHOMA CITY. — Oklahoma's liquefied-petroleum-gas dealers will soon ask Gov. Johnston Murray to prohibit out-of-state shipments of butane and propane.

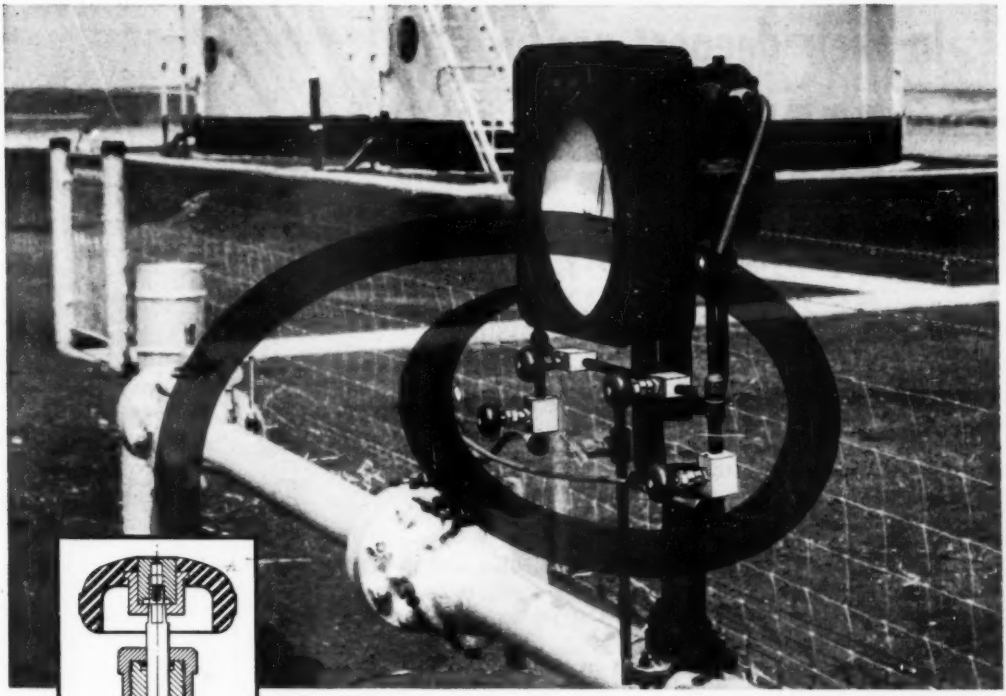
A delegation of 30 dealers recently told State Fire Marshal W. J. Marshall there is a critical shortage of L.P.G. in the state at present, and that if conditions continue as they are thousands of rural homes soon will be without heat.

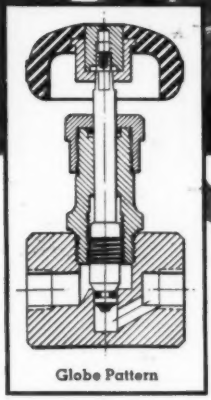
Several dealers said they need 50,000 gal. more a month to meet customer demands; others said they have been receiving only half their requirements.

Plant Dismantling Planned

PERRY, Okla.—Continental Oil Co. plans to dismantle a 1938-built gasoline plant it operates near Billings, Okla.

The plant, jointly owned with Phillips Petroleum Co., Shell Oil Co., and Tide Water Associated Oil Co., has been producing about 8,000 gal. of products per day.





Globe Pattern

GROVE
"O" RING "T" SERIES
SEAT-SEAL VALVE

Stainless Steel Body
Bakelite Hand-wheel
Sizes: ¼", ⅜", ½"
Pressure Range: to 3000 p.s.i.
Temperature Range: −30° to 180° F.
4 Designs: Globe, Angle, Tri-port, Cross-over

SAVE VALUABLE TIME ON CHART CHANGES

Speedy valve operation is but one of the advantages you gain with Grove "T" Series Seat-Seal Valves on orifice meter manifolds. Grove's unique design increases valve life, reduces maintenance costs, assures perfect seating every time.

The reason is Grove's patented "O" Ring Seat-Seal principle. Ordinary hand pressure easily opens and closes the valve with positive, bubble-tight shut-off. Wrenches are never required. With line pressure increasing the sealing force, dirt and other foreign matter have no effect. Wire drawing and seat cutting are impossible.

Precision-built Grove "T" Series Seat-Seal Valves are designed primarily for meter manifolds, gauge lines and other similar service. Wire or write today for full details.

GROVE

The reliability of Grove Valves and Regulators is proved by the thousands of successful installations handling air, gas, oil, water and other fluids. For the solution to your control problems, contact the nearest Grove representative.

"O" RING "T" SERIES SEAT-SEAL VALVES

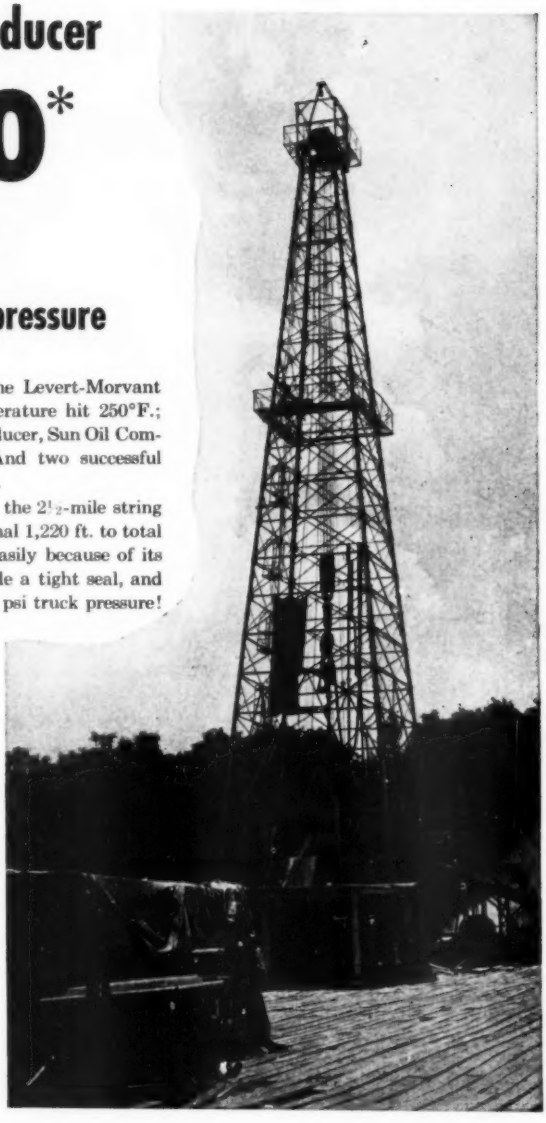
GROVE REGULATOR CO. 96th and HOLLIS STREETS, EMERYVILLE, CALIFORNIA
1901 CALUMET, HOUSTON 4, TEXAS • 250 EAST 88TH ST., NEW YORK 28, N. Y.
DISTRICT OFFICES: Dallas, Corpus Christi, Odessa, Tulsa — Lafayette, Louisiana — Tulsa, Oklahoma — Los Angeles, California

In their deepest producer

UNAFLO*

pumped easily

despite extreme heat and pressure



Down 14,506 ft. in Louisiana's Chacahoula field, the Levert-Morvant No. 2 ran into severe cementing conditions. Temperature hit 250°F.; bottom hole pressure, 9500 psi! For their deepest producer, Sun Oil Company chose dependable Unaflo Oil-Well Cement. And two successful cementing jobs—casing and liner—proved them right.

In just 90 minutes, Unaflo went in place around the 2½-mile string of 7″ casing. Then a 5″ liner was cemented an additional 1,220 ft. to total depth. Despite heat and pressure, Unaflo pumped easily because of its retarded set. A squeeze was not needed. Unaflo made a tight seal, and the formation did not break down, even under 4,800 psi truck pressure!

Whether your next job is hot and deep, or a routine cementing operation where delays *could* crop up, you can rely on Unaflo 3-way protection!

EASY FLOWING—Unaflo's high *initial* fluidity makes pumping easier right from the start.

SUSTAINED FLUIDITY—Unaflo isn't just "slow-setting." It's a retarded cement and *stays* fluid and pumpable throughout the retardation period. There's ample time, even in emergencies, to get the cement in place.

HARDENS NORMALLY—Unaflo, after its retarded period, makes a strong, tight seal—resistant to sulfate waters.

Helpful free bulletin gives facts-and-figures comparison of Unaflo's well-bottom performance with that of other cements. For your copy write: Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

*"UNAFLO" is the registered trade mark of the retarded oil-well cement manufactured by Universal Atlas Cement Company

WACO • KANSAS CITY • BIRMINGHAM • CHICAGO • NEW YORK • Export Distributor: United States Steel Export Co., New York

Universal Atlas Cement Company

OIL-FIELD CEMENTS

Unaflo *Retarded* Oil-Well Cement
Resistant to Sulfate Waters
Atlas Portland Cement—Type I

Atlas Portland Cement—Type II
Resistant to Sulfate Waters
Atlas High-Early Cement—Type III

OG-U-124

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—NBC Network*

Arizona Wildcat Checks New Area

NORTHERN Arizona, recognized as a possible future oil and gas province for at least 30 years but still without production, is getting another test. The few conclusive tests that have been drilled in northern Arizona have been along the extreme edges of the Black Mesa basin—the wildcat now drilling is in an entirely new area.

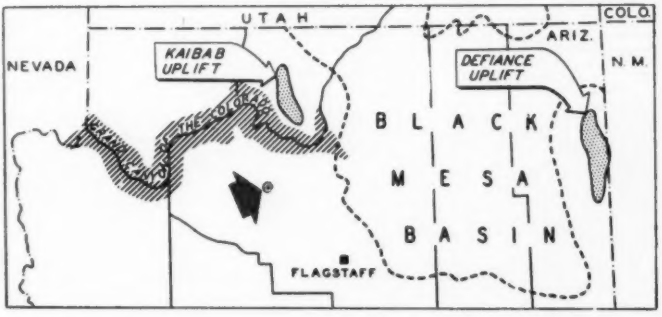
Sinclair Oil & Gas Co. 1 Santa Fe, C SW NE 35-28n-1w, Coconino County, arrowed on map, is located well to the west of the Black Mesa basin on the eastern flank of the Cordilleran geosyncline or Great basin.

The wildcat is on a structure delineated by detailed surface work. The structure is on the gentle southwest flank of the broad Kaibab uplift, the eastern flank of which forms the western edge of the Black Mesa basin. It is separated from the 1-mile-deep Grand Canyon of the Colorado by a pronounced syncline which is believed to have precluded the possibility of drainage into the canyon. Formations at the wildcat location are structurally lower than the outcrops in the Grand Canyon by about 800 ft.

Sinclair's wildcat started in the uppermost Permian-Kaibab at an elevation of 6,005 ft. The Permian-Coconino was topped at 608 ft. and the well is now drilling in the Permian portion of the Supai formation below 1,750 ft. The hole is to be dug to the pre-Cambrian, expected somewhere between 4,000 and 4,500 ft., unless, of course, commercial production is encountered in the sedimentary section.

The Mesozoic rocks of the Black Mesa basin, equivalents of which are productive of oil and gas in the San Juan basin just across the Defiance uplift, are not present at Sinclair's location; however, most of the Paleozoic section of the Black Mesa basin is present. The Pennsylvanian is not as well developed in the Black Mesa basin as it is in the San Juan basin and, as section is lost to the west, the basal Supai may be the only Pennsylvanian representative found in Sinclair's well.

Primary objectives of Sinclair's wildcat are: (1) The basal Supai, which is composed of limestones and calcareous sandstones and which unconformably overlies Mississippian rocks; (2) the Mississippian-Redwall, a massive, gray limestone; (3) the Devonian-Temple Butte, which consists of limestones and some coarse sandstones; and (4) the Cambrian-Tapeats, a crossbedded sandstone with conglomerate lenses in the basal portion.



Nearest significant production of oil and gas to this test is about 150 miles away in southeastern Utah at Boundary Butte in the area of the Monument uplift, the southern end of which is indicated on the sketch map by the irregular northern limit of the Black Mesa basin.

Considering the size and geologic attractiveness of parts of the northern portion of Arizona very few wells have been drilled there. The answer of course lies in the fact that an area more remote from existing marketing facilities would be hard to find within the continental limits of the United States. However, the area has seen rather high interest in surface and geophysical (seismograph and magnetometer) work in the past few years and drilling plans are now being formulated by a few companies. Production in Arizona, which would have been a white elephant a few years ago, would now be most acceptable in the eyes of oil producers; and Arizona may be the next state to join the growing list of oil-producing states.

—Philip C. Ingalls

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Continental Oil Co. found oil in the Tensleep at the first deep test in Meadow Creek pool, Wyoming. Sinclair Oil & Gas Co. recovered oil on test of the First (D) sand at a new wildcat in Logan County, Colorado.

SOUTHWEST TEXAS.—Humble Oil & Refining Co. has opened a new oil pool in Atascosa County 2 miles northwest of Charlotte field. The well, 1 J. H. Jones, flowed 53 bbl. of 37.8°-gravity oil daily through ¼-in. choke.

SOUTH LOUISIANA.—Sunray Oil Corp. 1 Fred Loewer, 45-8s-2e, Acadia Parish, has been completed for 209 bbl. of 48.5°-gravity distillate plus 2,983,000 cu. ft. of gas daily through 10/64-in. choke from the Hackberry formation at 11,178-85 ft. The new field opener is 5 miles northeast of North Crowley field and 3 miles northwest of Branch field production.

Kansas

374-Bbl. Pumper Opens Third Gove County Pool

GOVE County, in the western part of the state, has its third oil pool with the official completion by Musgrove Petroleum Co. of its 1 Teeter, NE NE SE 26-13-30. The discovery well, 7 miles southwest of Gove, established a pumping potential of 374 bbl. per day. Production is from the Mississippian section, opposite which casing is perforated at 4,547-50 ft. The pool has been assigned the name of Gove.

The location is about 7 miles northwest of the Coberly pool, first production found in the county and discovered by Cities Service Oil Co. early in 1950. Production in this pool is from the Marmaton (Pennsylvanian). The county's other pool, opened last October by Herndon Drilling Co., is about 8 miles southwest of the Coberly pool in the southwestern part of the county. It produces from the Lansing-Kansas City lime section.

Among other areas officially opened for production during the week were the Hungry Hollow pool in northern Rusk County and the Nigger Creek pool in Cowley County. Discovery well of the former is Sam Kelinson and associates 1 Pfeifer, NW NW NW 6-16-17, which pumped 160 bbl. per day from Lansing-Kansas City lime. Casing is perforated at 3,343-51 ft. and 3,342-46 ft. Crest Petroleum Co. and National Cooperative Refinery Association 1 Morgan, C N½ SW NW 22-34-3e, discovery well of the Nigger Creek pool, pumped 50 bbl. per day from Bartlesville sand at 3,281-3,302 ft.

Heathman & Co. has completed its 1 Keller, SW SW NW 6-11-19, northwestern Ellis County, opening another new area about a mile northwest of the Warren pool. It pumped 178 bbl. per day from the Lansing-Kansas City lime with casing perforated at 3,536-44 ft.

Two new gas discovery wells also were included among completions of the week. E. H. Adair 1 Unruh, NW NW NW 21-20-14, a mile north of the Dundee gas pool, Barton County, flowed 6,875,000 cu. ft. per day from casing perforations at 3,595-3,607 ft. in Arbuckle lime. Drillers Production Co. 1 Wall, SE SE SE 25-22-3w, 2 miles northeast of the Stuckey pool, Harvey County, flowed 3,000,000 cu. ft. per day from the Mississippian opposite which casing is perforated at 3,150-67 ft.

Alpine Oil & Refining Co. is putting its 1 Dorshaffer, SE SE NE 34-19-13, southern Barton County, on the pump after swabbing tests in which it produced at the rate of 8 bbl. of oil per hour. Production is from Lansing-Kansas City lime, opposite which casing is perforated at 3,238-44 ft. The well opens a new area about ½ mile east of Great Bend. It is about 2½ miles southwest of the active Fort Zarah pool.

KANSAS SUCCESSFUL WILDCATS

Barton County: Marmad 1 Schaffer, SE SE SE 23-19s-14w, flowed 1,788 bbl. oil at 3,332-37 ft., TD 3,505 ft.

Harvey County: Drillers Production Co. 1 Wail, SE SE SE 25-22s-3w, 2.9 M.c.f. gas at 3,150-67 ft., TD 3,715 ft.

Rooks County: M. Sitrin 1 Ostmeyer, NW NW SW 31-6s-19w, pumped 60 bbl. oil at 3,545-56 ft., TD 3,556 ft.

KANSAS WILDCAT FAILURES

Butler County: National Associated Petroleum Co. 1 Buckman, CNL NE NW 11-25s-7e, dry, TD 3,216 ft.

National Associated Petroleum Co. 1 Liggett "A," NW NW SE 17-25s-7e, dry, TD 2,793 ft.

Palmer 1 Allan, SE SW NW 23-26s-6e, dry, TD 3,200 ft.

Watson 1 Piper, SE NW NE 25-29s-3e, dry, TD 2,536 ft.

Cheyenne County: Ohto 1 Rose, NE NE NE 35-1s-40w, dry, TD 5,270 ft.

Ellis County: Murfin and M. Sitrin 1 Ball, SW SW SW 8-12s-18w, dry, TD 3,862 ft.

Gove County: G. H. Abell 1 fee, SW SW SE 30-12s-30w, dry, TD 4,646 ft.

Brown & Tomer 1 Fleming, NE NE SW 10-15s-30w, dry, TD 4,483 ft.

Harvey County: Alladdin et al 1 Windsor, SW NW NE 1-22s-2e, dry, TD 3,265 ft.

D. Ingling et al 1 Hill, NW NE NE 23-24s-2e, dry, TD 3,378 ft.

Hodgeman County: H. Gordon 1 Andrews, SE SE NW 25-23s-25w, dry, TD 4,790 ft.

Lane County: Continental Oil Co. 1 Armantrout, SW SW SW 21-18s-30w, dry, TD 5,157 ft.

McPherson County: National Associated Petroleum Co. 1 Swanson, NE NE SE 8-19s-2w, dry, TD 3,623 ft.

Ness County: Rycade Oil and Federal 1 Solze, NW NW SE 28-17s-26w, dry, TD 4,425 ft.

Phillips County: National Associated Petroleum Co. 1 Emerick, NE SW NW 10-4s-18w, dry, TD 3,600 ft.

Reno County: Musgrove 1 Martin, NE NE NE 7-23s-10w, dry, TD 3,820 ft.

Rice County: Duke & Wood and Bay Petroleum Co. 1 Ehler, NE SE NE 28-19s-7w, dry, TD 3,634 ft.

Russell County: Time 1 A. Thompson, SE SE SE 7-11s-14w, dry, TD 3,560 ft.

Saline County: Anschutz 1 Roesner, NE NE SW 9-14s-2w, dry, TD 3,370 ft.

National Associated Petroleum Co. 1 Nelson, SW SE SW 22-16s-3w, dry, TD 3,577 ft.

Sedgwick County: J. P. Gaty 1 Shorthose, NE SE NE 1-25s-1e, dry, TD 2,997 ft.

Smith County: J. H. Snowden 1 Lull, CSW NW 5-3s-11w, dry, TD 4,176 ft.

Stafford County: Buick 1 Olmstead, NE NE SE 16-21s-12w, dry, TD 3,650 ft.

Harms & Knight 1 Lincoln, SE NW SE 17-21s-14w, dry, TD 3,796 ft.

Westgate-Greenland 1 Sutton, NW NW SW 21-22s-14w, dry, TD 4,013 ft.

Sumner County: Deep Rock 1 Riddell, SW SE NW 16-31s-1w, dry, TD 4,241 ft.

Thomas County: National Associated Petroleum Co. 1 Ostmeyer, SE SE SE 1-10s-31w, dry, TD 4,907 ft.

Trego County: Anschutz 1 Bouer, NE NE NW 26-13s-24w, dry, TD 4,650 ft.

Sohio and B&R 1 Hille, SW SW SE 14-15s-24w, dry, TD 4,720 ft.

Eastern Texas

Development Drilling Goes Ahead in Grayson County

DALLAS.—Development drilling was getting along in the new Saddler-Pennsylvanian field of Grayson County. Mid-Continent Petroleum Corp. 1-A Susie Martin was drilling in shale at 2,463 ft. and the company's 3 Susie Martin was in lime at 6,623 ft.

West of Hagerman, Shell Oil Co. 2 Q. Little, a semiwildcat, was drilling below 4,908 ft.

Four miles north of Dorchester, L. Reed Survey, Standard Oil Co. of Texas 1 Bradshaw was drilling shale and lime at 8,614 ft.

Sussex Oil Co., Wichita Falls, has filed permit to drill a 3,900-ft. wildcat northeast of Paris in Lamar County. The well is to be the 1 R. L. Lewis, on a 222-acre tract in the Ingram Survey, 5 miles northeast of town.

Another confirmation test has ended in failure for the Southern Pine field of Cherokee County, as Geier-Jackson, Inc., 3 Southern Pine, John Powers Survey, was dry at 5,368 ft., in the Woodbine.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Fannin County: Leland Fikes 1 Sarah Brown, T. Ragsdale Sur., dry, TD 4,220 ft.

Grayson County: Standard Oil Co. of Texas 1 W. E. Stephens, D. Meade Sur., A-805, dry, TD 6,094 ft.

Henderson County: Texas-Jersey Oil Co. 1 R. F. Johnson, G. L. Johnson Sur., dry, TD 5,212 ft., Paluxy 4,875 ft.

Houston County: Ralph Spence 1 Dailey-Frazier, S. Cheairs Sur., dry, TD 6,393 ft., Woodbine 6,190 ft.

Navarro County: L. A. Pinkston 1 J. D. Bryant, M. Shire Sur., dry, TD 5,815 ft.

Upshur County: A. O. Phillips 1 J. M. Stevens, W. H. Williams Sur., dry, TD 9,500 ft., elev. 371 ft., massive anhydrite 7,130 ft.

Wood County: Phillips & Stephens 1 B. Holland, J. B. Chirino Sur., dry, TD 4,996 ft.

Trans-Texas Drilling Co. 1 G. Topley, W. H. Secrest Sur., dry, TD 5,380 ft.

Southwest Texas

Atascosa County Well Opens New Pool

CORPUS CHRISTI.—Humble Oil & Refining Co. has opened a new oil pool in Atascosa County 2 miles northwest of Charlotte field. The well, 1 J. H. Jones, flowed 53 bbl. of 37.8°-gravity oil daily through ¼-in. choke. Completion was made from open hole, with the venture bottomed at 4,980 ft. and casing cemented at 4,966 ft. On a drill-stem test at 4,971-89 ft., recovery was 180 ft. of 36.5°-gravity oil with trace of mud.

Two miles northwest of Sayersville in Bastrop County, Thomas Jordan has cored the Georgetown Lime with heavy black oil in fractures and recovered 1,963 ft. of heavy oil from the Edwards lime at 1 H. N. Bell, Jr. The core in the Georgetown was cored at 3,042-3,150 ft. The Edwards showed fractures with sulfur odor in top and oil odor in bottom at 3,150-3,218 ft. Operator conducted drill-stem test at 3,042-3,165 ft., tool open 1¾ hours. Recovery was 1,963 ft. of heavy oil. Bottom-hole flowing pressure registered 975 psi. Sidewall samples in the Navarro zone at 1,190-1,210 ft. showed sand with slight fluorescence and faint oil odor. Operator is plugging back to test the Georgetown.

Sid Katz 1 Jesse Trevino, second well in Saspamco field, Wilson County, has been completed as an oiler and extends the field 3,000 ft. to the northeast. On potential test from open hole at 2,835-41 ft., the well flowed 165 bbl. of 24°-gravity oil in 5 hours, which would give a daily rate of 792 bbl. The area has three dry holes offsetting the discovery to the north, south, and east.

New Vicksburg gas production has been established in Sullivan City field, Hidalgo County, at Phillips Petroleum Co. 1 Garza F. Flores, Porcion 39, Tract 236. From perforations at 4,990-5,010 ft., the well flowed an unestimated amount of gas and distillate through 3/16-in. choke. Operator is installing separator.

A possible new gas-distillate discovery in Hidalgo County is indicated at Sinclair Oil & Gas Co. 2 Gomez Unit, in Alamo Land & Sugar Co. subdivision, 3 miles east of Ansley. On 1-hour and 47-minute drill-stem test at 7,192-7,207 ft., recovery was 60 ft. of distillate. Bottom-hole pressure was 3,700 psi. Additional testing is slated for the venture.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Brooks County: Oil discovery—Humble Oil & Refining Co. G-1 Mestena Oil & Gas Co., W. W. Jones Subdivision, La Mestena y Gonzalena Grant, TD 8,514 ft., perf. 6,114-24 ft., IP: 131 bbl. oil per day, 3/32-in. choke, 50.9°-gravity.

McMullen County: Gas discovery—Newman Bros. & Alaska Steamship Co. 1-G South Texas Syndicate, James Fitzpatrick Survey, A-759, TD 6,350 ft., Lower Wilcox

Picture of Complete Satisfaction

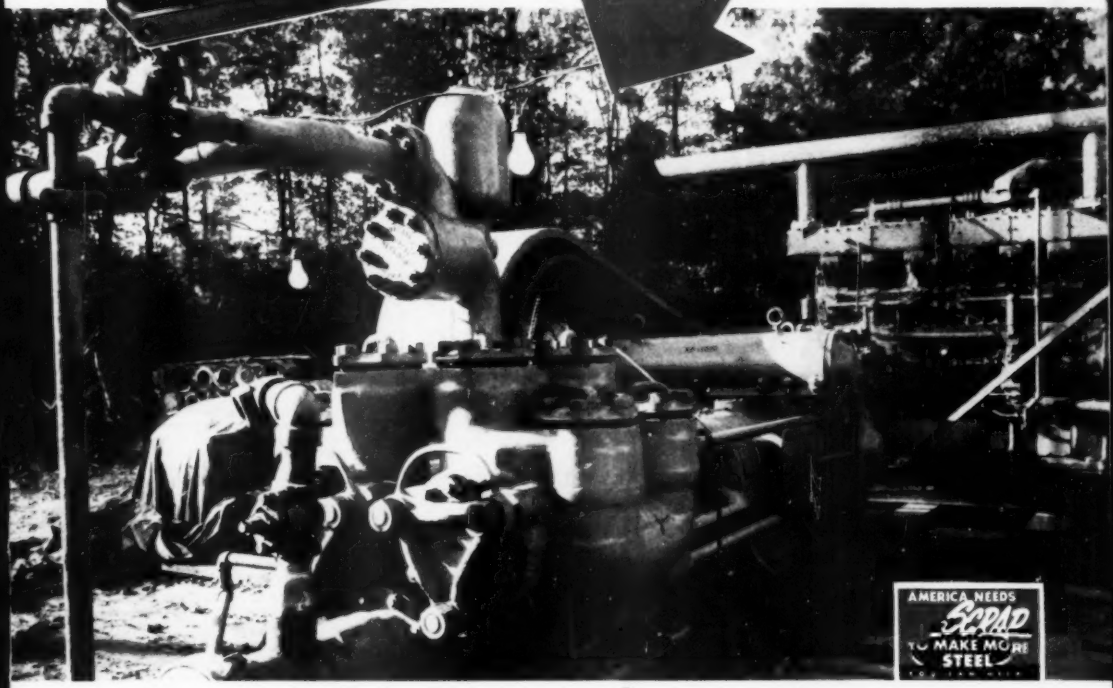
(It's a Wheland!)

They just don't make a better work horse than a WHELAND Mud Pump. This one happens to be owned by C. A. Hilburn Drilling Company, Inc., and the picture was made on location near Bernice, Louisiana. But you can snap a picture like this wherever men drill wells and the crew will tell you that nothing around the rig is more completely satisfactory than WHELAND equipment.

The rotary, swivel, and traveling block on this rig are WHELAND too.

Your determination to work with the best equipment money can buy will lead you eventually to your near-by Jones & Laughlin Supply store.

We're ready to strike up a mutually helpful friendship NOW.



Jones & Laughlin Supply Company

"... here's MY warehouse!"

EXPORT: 405 Lexington Avenue, New York, N. Y., U.S.A.

General Offices: TULSA, OKLAHOMA

82 STORES • 17 OFFICES • 7 RESIDENT SALESMEN

J&L STEEL

Subsidiary of Jones & Laughlin Steel Corporation

6,158-68 ft. and 6,122-32 ft., IP: 22,500,000 cu. ft. of gas daily, open flow.

Zapata County: Oil discovery—The Texas Co. 1 Fernando Cuellar et al., E. & F. Cuellar Survey, A-208, TD 7,610 ft., perf. 3,020-30 ft., IP: 123 bbl. oil per day on pump, 39.6°-gravity.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Dimmit County: Intex Oil Co. and Howeth & Mason 1 Dee Davenport State, A. Eardley Survey 30, A-1519, dry, TD 4,474 ft.

Frio County: Daubert & Achning 1 J. E. Berry, T. C. Calk Survey 167, A-366, dry, TD 3,701 ft.

Jim Hogg County: Dulaney Oil Co. et al. 1 Merchants State Bank & Trust, S. L. Fite Survey 268, Jackson Subd., Block 10, dry, TD 2,531 ft.

Boyce-Smiser-Runion Oil Co. 1 Yeager Estate, Noriecitas Grant, Survey 10, dry, TD 3,794 ft.

LaSalle County: O. N. Beer et al. 1 Harris Bros., I&GN Survey 41, A-425, dry, TD 5,018 ft.

Nueces County: LaGloria Corp. 1 State 249, State Tract 249, Red Fish Bay, dry, TD 8,700 ft.

Webb County: Harold K. Boysen 1 Hermadlinda Garcia et al., Survey 392, Los Ojuelos grant, dry, TD 3,223 ft.

Harold K. Boysen 1 Perez Garcia, Survey 711, dry, TD 2,624 ft.

Clardy & Barnett 1 A. J. Moos, CCSD & RGNG Survey 65, Block 1, dry, TD 2,490 ft.

G. G. Martimer, Jr., et al. 1-A Adolph Moos, et al. CCSD & RGNG, Sec. 24, Block 1, dry, TD 2,446 ft.

Zapata County: Dulaney Oil Co. 1 Roman Garza, BS&F Survey 161, Block 3, share 2, dry, TD 1,968 ft.

Charles E. Long, Sr., et al. 4 Mrs. Noyes Smith et al. El Javali grant, H. Harvey Subd., dry, TD 1,794 ft.

Permian Basin

Ector County Wildcat Might Be Reef Section

MIDLAND.—V. A. Brill 1 Sallie Ratliff Ector County wildcat east of the shallow North Cowden field, was attracting considerable interest as a Wolfcamp discovery, and some reports rumored it might be a reef section on the order of the prolific Adair-Wolfcamp field in Terry County.

The 1 Ratliff, NW NW 1-42-T1S-T&P, was originally scheduled to 13,500 ft. to explore the Ellenburger and whether or not the well would be drilled ahead had not been learned.

First drill-stem test from 9,640-9,104 ft. had oil at the surface in 20 minutes. It was allowed to flow for 7 minutes and observers estimated the output to be around 100 bbl. an hour. The test was through ⅝-in. bottom choke and 1-in. top opening. Drill pipe unloaded when coming out and recovery was some 2,000 ft. of clean, 43°-gravity oil with no water.

It was drilled ahead to 9,714 ft. and tested between 9,704-14 ft. Oil reached the top in 30 minutes and was turned into pits. The gage was 13 bbl. of oil in 30 minutes through ⅞-in. choke, then 5½ bbl. of oil in 30 minutes on ¾-in. choke. Recovery was reversed out, which had some salt water on the bottom. Operators were waiting on orders to set casing or drill ahead.

Honolulu Oil Corp. has started its 1 Herbert Cope as an east offset to its 1-A Sugg, Sterling County discovery and first Spraberry producer for that county. Completion of the 1-A Sugg was made from the Spraberry between 5,131-51 ft. and daily potential of 344 bbl. of 38°-gravity oil (previously reported as 42° gravity), was based on 8½-hour test of 122 bbl. of new oil, with no water, through ⅞-in. choke.

Two miles west of the Sugg area in Reagan County, Devonian Oil Co. 1 Sugg was swabbing on perforations in the Spraberry at 5,632-40 ft. and from open hole below casing set at 5,641 ft. to 5,653 ft., plugged back depth. Recovery was 102 bbl. of oil, with time not specified.

Atlantic Refining Co. 1-N Noelke, a reworked wildcat in Irion County, originally drilled by Moore Exploration Co., perforated casing in Strawn lime at 7,413-66 ft., treated with Hydrafrac, swabbed out load and was shut in for 48 hours. When opened the well flowed 69.6 bbl. of 40°-gravity oil in 14 hours through ½-in. choke. It was shut in to move off the rig, and continue testing. Location is 13 miles southwest of Mertzon.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Midland County: The Texas Co. 1-C Scharbauer, 42-40-T2S-T&P, TD 10,905 ft., elev. 2,825 ft., perf. 9,830-90 ft., IP pumped 14 bbl. 38°-gravity oil.

Tom Green County: The Texas Co. 1 Joe E. Hall, 66-5-H&TC, TD 1,150 ft., pay 1,046-93 ft., IP bailed 15 bbl. 34°-gravity oil.

Upton County: Fogelson & Pauley 1-21 Hunt, 21-D-EL&RR, TD 7,364 ft., elev. 2,730 ft., Spraberry pay 7,128 ft., IP 336 bbl. 38°-gravity oil, 32/64-in. choke, TP 125 psi., GOR 394 cu. ft., North Pembrook area.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crockett County: Gulf Stream Oil Co. 1 University, 22-40-University, dry, TD 1,604 ft.

The Texas Co. 1-Y State, 25-40-University, dry, TD 2,154 ft.

Irion County: G. W. Strake 2-B Lillian Winterbotham, 20-21-H&TC, dry, TD 7,400 ft., elev. 2,456 ft., Wolfcamp 5,135 ft., Strawn 7,362 ft.

Lynn County: Benedum-Trees Oil Co. 1 J. B. Moore, 47-8-EL&RR, dry, TD 7,866 ft., elev. 3,035 ft., Spraberry 6,596 ft.

Midland County: Greenbrier Oil Co. 1 O. H. McAlister, 40-37-T1S-T&P, dry, TD 12,175 ft., elev. 2,722 ft., Spraberry 7,332 ft., Dean 8,669 ft., Wolfcamp 8,940 ft., Strawn 10,236 ft., Devonian 11,227 ft., Fusselman 11,760 ft., Montoya 11,835 ft., Ellenburger 12,030 ft.

Mitchell County: Richardson & Bass 2 J. F. McCabe, 5-12-H&TC, dry, TD 6,985 ft., elev. 2,219 ft., Caddo 6,934 ft.

Reagan County: Spartan Drilling Co. 1 Calvin Sugg, 142-2-T&P, dry, TD 5,858 ft., elev. 2,677 ft.

Sterling County: H. S. Moss 1 H. F. Jackett, M. E. Gilmore Sur. 2, dry, TD 5,005 ft., elev. 2,593 ft.

Upton County: Standard Oil Co. of Texas 21-128 R. S. Windham, 128-D-CCSD&-RGNG, dry, TD 12,677 ft., elev. 2,275 ft., Wolfcamp 7,440 ft., Strawn 9,490 ft., Ellenburger 12,538 ft.

Runnels County: Garrett Prod. Service 1 W. H. Gross, Sec. 5, D. H. McFadin Sur., dry, TD 4,810 ft., elev. 1,740 ft., reef 4,389 ft., Caddo 4,698 ft.

Miami Operating Co. 1 H. F. Linderman, Austin & Williams Sur. 26, dry, TD 3,958 ft., Gardner 3,771 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURE

Briscoe County: Standard Oil Co. of Texas 1 W. D. Owens, 142-M10-D&SE, 15 mi. N Silverton, dry, TD 8,393 ft., elev. 3,295 ft., Wolfcamp 4,560 ft., Cisco 5,875 ft., Canyon 6,380 ft., Strawn 6,840 ft., Bend 7,495 ft., Mississippian 7,760 ft., granite wash 8,350 ft.

SOUTHEAST NEW MEXICO

HOBBS.—The Texas Co. has completed its 1-AT State as a Wolfcamp discovery. The wildcat, in 10-14s-33e, flowed 34.6 bbl. of oil, plus some water, from perforations at 9,854-78 ft.

The same company's 1-AW State, one location northeast of the 1-AR State, recent Devonian discovery, has been plugged after drilling to the Devonian which carried water.

Skelly Oil Co. and others 2-J Mexico, in the new Ellenburger area of southeast Lea County, was reported slightly higher than the 1-J Mexico, Ellenburger discovery. The 2-J Mexico flowed 292 bbl. of 44°-gravity oil in 4 hours on drill-stem test at 10,003-10,133 ft. Second test at 10,134-10,239 ft. flowed better than 50 bbl. an hour on a 3-hour gage. It was being drilled to 10,300 ft. for completion.

In northwest Lea County, Amerada Petroleum Corp. 1-ECC State, 11-12s-32e, north extension to a recent discovery, flowed 218 bbl. of oil in 4 hours on a test of the Devonian at 11,000-11,070 ft. It was drilled ahead and tested between 11,070-11,130 ft. where it had flowing oil in 8 hours and gaged 61 bbl. of oil in 4 hours.

SOUTHEAST NEW MEXICO SUCCESSFUL WILDCATS

Lea County: Ohio Oil Co. 1 Carruth-Federal, 25-9s-37e, TD 12,097 ft., elev. 3,972 ft., PB 4,975 ft., perforated 4,914-30, 4,936-46 ft., IP flowed 27 bbl. 18.8°-gravity oil.

Magnolia Petroleum Co. 1 J. D. Black, 9-15s-36e, TD 11,503 ft., elev. 3,929 ft., Pennsylvanian pay 11,440 ft., IP pumped 156 bbl. 45°-gravity oil.

Skelly Oil Co. 9-O State, 31-16s-37e, TD 8,500 ft., elev. 3,828 ft., Wichita 8,115 ft., pay 8,117 ft., IP 700 bbl. 39°-gravity oil, ¾-in. choke, TP 50 psi., GOR 481 cu. ft.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Chaves County: J. I. O'Neill, Jr. 1-A Lodewick-Federal, 7-7s-27e, dry, TD 2,180 ft., San Andres 1,547 ft.

Eddy County: Hargrave 1 State, 22-24s-27e, dry, TD 2,414 ft., elev. 3,227 ft., Delaware lime 2,265 ft., sand 2,316 ft.

Lea County: Texas Crude Producing Co. 1 Spencer-State, 8-14s-32e, dry, TD 10,675 ft., elev. 4,358 ft., San Andres 3,782 ft., Abo 7,440 ft., Permo-Pennsylvanian 8,920 ft.

Canadian Fields

Substantial Oil Recovery in Camrose Area Wildcat

CALGARY.—Golden Spike Western Petroleums, Ltd., and Dempsey Oils, Ltd., have found oil at their first joint venture on farmout lands from Imperial Oil, Ltd., in the Camrose area of central Alberta. During initial drill-stem tests in the Viking sand, the well gave a moderate flow of natural gas plus a substantial recovery of clean crude oil.

The well is Golden Spike-Dempsey 2 Camrose, in LSD 5, 33-47-20w4, about ⅜ mile northeast of Anglo-Home-C. & E. 9 Viking oil well. A 1-hour drill-stem test at 3,202-13 ft. gave a flow of natural gas in 15 minutes, with maximum rate 70,000 cu ft. daily and decreasing to a small blow as oil entered the pipe. When pipe was pulled it was found to contain 700 ft. of oil, no water. Crew has now cored on to 3,217 ft. with no sign of water in core. Preparations are now being made to run string of production casing for completion.

The team of Texaco Exploration Co. and McColl-Frontenac Oil Co., Ltd., has so far opened up 213 ft. of distillate-bearing natural-gas zone in the D3 coral reef at its A-1 Bonnie Glen. Increasing volumes of natural gas, accompanied by distillate, are being found during drill-stem tests. During latest test, at bottom 6,605 ft., natural gas flow rate was just under 9 million cubic feet daily. The distillate recovered is believed to be in the 60°-gravity range. The flow rates being obtained during drill-stem tests are not a measure of the well's potential, and on open flow the well would likely rate among the larger wet-gas wells so far drilled in Canada. Coring and testing

operations in D3 reef are being continued below 6,605 ft.

Texaco A-1 Bonnie Glen, on LSD 3, 20-47-27w4, is located about 6½ miles south of Texaco-McColl's Wizard Lake oil wells. That team has so far completed eight oil wells at Wizard Lake and currently has three others in various stages of drilling.

The British American Oil Co., Ltd., contacted D3 zone of Devonian at an elevation 415 ft. above the water line at its South Calmar area well which discovered oil in the D2 zone last week. The well, 3-2 South Calmar, in LSD 3, 2-49-27w4, is ¼ mile south of British American 6-2 D3 oil discovery and 2¼ miles northeast of Wizard Lake oil wells. First drill-stem test in D3 at 3-2 well flowed oil to the surface.

D3 reef was topped at 5,955 ft., or 3,465 ft. subsea (K.B. elevation 2,490 ft), or 244 ft. higher than 6-2 oil well. A 30-minute drill-stem test from 5,949-69 ft. gave a maximum natural gas flow rate of 354,000 cu. ft. daily, a flow of oil to the surface in 17 minutes and recovery of 1,260 ft. of gassified oil.

Crew is now running electrolog and will then set casing. The full D3 pay section will not be cored, but crew will take hole down another 20 ft. and then place the well on production.

The 3-2 South Calmar well contacted D2 zone of Devonian at 5,488 ft., or 2,998 ft. subsea, and found around 80 ft of water-free zone. The top 22 ft. of that D2 section was in the gas cap, while the remainder was oil bearing. A later well will likely be drilled to tap the D2 oil zone on this 40-acre tract.

Perforating and testing operations have begun at the Seaboard-Imperial-Anglo 1 Buffalo Lake wet-gas discovery well. This venture, located in the Buffalo-Lake-Bashaw area of central Alberta, about 115 miles northeast of Calgary, discovered natural gas plus naphtha during Lower Cretaceous drill-stem tests about 2 months ago.

The 1 Buffalo Lake completed drilling at 5,964 ft., was plugged back to the Cretaceous to 4,400 ft., and 5½-in. production casing was set at that depth. Perforations have been carried out, but results of the initial tests have not as yet been received. During drill-stem tests in the Cretaceous at 4,335-70 ft., prior to reaching total depth, the well gave flows of wet gas which rated maximums of 1,930,000 cu. ft. daily at the end of 1 hour. An unspecified volume of naphtha was recovered in the drill pipe after the tests.

CANADIAN WILDCAT FAILURES

Union-Crow 1 Indian Lake, LSD 10, 21-4-13w4, TD 3,025 ft.
Imperial 1 Dizzy Creek, LSD 7, 33-123-17w5, TD 3,612 ft.
Shell 1 Kimiwan, LSD 2, 26-80-20w5, TD 7,003 ft.
Northland 1 Peace River, SW¼ 32-83-21w5, TD 1,300 ft.
Stanolind 1 East Peace River, LSD 1, 22-84-17w5, TD 6,096 ft.
Great Plains 16-28 Reef, LSD 16, 28-45-14w4, TD 4,114 ft.

CANADIAN WILDCAT SUCCESS

Dragon Oils & Gas 1 McQuid, LSD 16, 19-48-5w4, TD 2,000 ft. (capped gas well from Cretaceous).

Texas Gulf Coast

Lower Frio Discovery in Fort Bend County Completed

HOUSTON.—Powers Production Co. has completed 1 J. R. Farmer for a new Lower Frio oil discovery in Fort Bend County. On potential test, the well flowed 66 bbl. of oil daily through perforations at 6,974-78 ft. Tubing pressure registered 395 psi. Hole is bottomed at 7,215 ft. with 5½-in. production string cemented at 7,042 ft. The new discovery is located in Joel Lee Survey, Abstract 278.

Three miles south of Altair townsite, Colorado County, Fidelity Oil & Royalty Co. has set 5½-in. casing at 11,007 ft. in 1 W. A. Struss, and are preparing to test. The well is located in J. L. Whitman Survey, Abstract 600, approximately 3 miles from any production.

G. W. McCarter has potentialed 2 Angersteine, wildcat 7 miles southwest of Victoria, in Victoria County, for 60,000,000 cu. ft. of gas daily from perforations at 3,540-48 ft. Total depth of the well is 4,424 ft. with 5½-in. production string set on bottom. This well is located 1,952 ft. southeast of 1 Angerstein, also a gas discovery, which was completed in the 2,200-ft. zone for 20,000,000 cu. ft. of gas daily.

Three miles northeast of Berclair, Goliad County, Magnolia Petroleum Co. has completed 1 Bill Rodgers for a small gas discovery. From perforations at 3,205-15 ft., the well flowed 1,450,000 cu. ft. of gas daily with shut-in pressure of 1,232 psi.

The Texas Co. has staked location for a 13,000-ft. wildcat in Matagorda County 1½ miles northeast of Wadsworth. Test is 1 J. C. Lewis in B. F. Jacques Survey.

A slight show of oil was indicated on mud logger at 6,848 ft. in Anderson-Prichard Oil Corp. 1 R. A. Johnson, Colorado County wildcat. Interval from 6,835-91 ft. was cored with some fluorescence in stringer sands, but no shows of oil or gas. Core of interval containing gas show was taken from 6,845-55 ft. Operator is coring ahead at 7,958 ft.

An extension to Fulshear field, Fort Bend County, has been completed at L. D. French 1 Earl H. Roesner, which flowed 99 bbl. of oil daily through 9 64-in. choke, under 700 psi. tubing pressure. Production is from the Watson sand at 6,853-67 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Fayette County: Oil discovery—Hamman Oil & Refining Co. 1 Frank Weidel et al.,

John Vivien ½ league, TD 2,503 ft., perf. 2,361-64 ft., IP: 84 bbl. oil per day, 23°-gravity.

Fort Bend County: Oil discovery—Powers Production Co. 1 J. R. Farmer, Joel Lee Survey, A-278, TD 7,215 ft., Lower Frio 6,974-78 ft., IP: 66 bbl. oil per day, 10/64-in. choke.

Matagorda County: Gas discovery—Stanolind Oil & Gas Co. 1-B Franz Huebner, Peter Bertrand Survey, A-5, TD 11,390 ft., perf. 9,315-31 ft., IP 4,000,000 cu. ft. of gas daily, TP 2,400 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURE

Karnes County: L. R. Allison 1 Sam Vander Weide, Thomas Hinds Survey, A-335, dry, TD 4,215 ft.

Rocky Mountain

Wyoming Tensleep Recovery Indicates Added Reserve

DENVER.—A considerably added reserve for the Meadow Creek field, Johnson County, Wyoming, is indicated with the recovery of oil on drill-stem test of the first well to Tensleep in the field. The well is Continental Oil Co. 98 Unit, 11-41n-78w, in the center of the field, and on 1 hour test 8,989-9056 ft., in the top of the Tensleep, the well made 5,500 ft. of oil. The oil is 30° gravity and similar to that found in other Tensleep producing fields of the region. Continental made the first discovery in this area, the Sussex pool discovery, in 1948 and drilled the first well in Meadow Creek, a Lakota sand producer, in 1949. The company, as operator of both units, now has a curtailed production in the fields of more than 10,000 bbl. daily, and has had a continual drilling program in the fields.

Continental made the Sussex-Tensleep discovery earlier this year and now has two completed producers in that formation. Oil is also found in the Sussex sand, Shannon sand and Lakota sand in the field, and Continental's program has included development drilling to each of the formations. Discovery of oil in the Tensleep will undoubtedly call for a considerable additional drilling to that formation.

This is the third Tensleep discovery in this area of Wyoming in the past few weeks. Recently Stanolind Oil & Gas Co.-Continental found Tensleep oil through a 220-ft. section at the North Fork wildcat, 1 Government-Mains, C SW SW 19-44n-81w, Johnson County, northwest of Sussex. Last week Barnes-Anderson-Peterson found Tensleep oil on test at 1 Government, NE NW SE 1-36n-82w, in the North Casper area, south of the Salt Creek field in Natrona County. Tensleep has not been considered an important reservoir in this particular portion of the Powder River basin, although production was found in that zone from a small area of the Salt Creek field.

Sinclair Oil & Gas Co. has an apparent new field in the Logan County, Colorado, portion of the Denver-Julesburg basin. The well, 1 Parke, NW NW NE 6-9n-52w, found the first sand at 4,749 ft., and on test of the zone 4,785-4,810 ft., the well made 1,040 ft. of 38°-gravity oil with 2,180 ft. of muddy water in 1 hour. Sinclair has run casing to total depth at 4,860 ft. and will perforate and make further tests of this sand. The wildcat is 5 miles northeast of the Mount Hope-Walker pools and 12 miles directly north of the town of Sterling. This is Sinclair's second discovery in this basin during recent months.

Husky Oil Co. and Wilshire Oil Co. have tested additional gas and condensate at 1 Torgeson, C NE NE 29-49n-93w, wildcat in the Five Mile area, Big Horn County Wyoming, and is continuing to drill in the Phosphoria formation. The test was of the zone 11,678-11,725 ft., and there was gas at the surface in 75 minutes with several gallons of condensate recovered on test.

Gas flow was estimated at between 5 and 10 million cubic feet daily. The wildcat is northwest of the Worland pool, where there is oil production from the Phosphoria. Southwest of Worland Gulf Oil Corp. is preparing to test shows logged in the Frontier at 1 Stockham Federal, C SE NW 2-46n-94w, Washakie County. A number of shows of oil were logged in cores of the Frontier and the operator is now testing the zone prior to drilling ahead for tests of the Phosphoria and Tensleep formations. Pure Oil Co., operator of the Worland Unit, produces oil from the Frontier as well as phosphoria in that field.

Of the 19 wildcat completions this week only the 2 Williston basin discoveries were successful. Shell Oil Co. completed the Richey area, Montana, discovery for an initial of 1,656 bbl. oil oil daily, although the well has reportedly dropped considerably from that gage. In North Dakota, Amerada Petroleum Corp. recompleted the Beaver Lodge, Williams County, discovery for a gage of 25 bbl. of oil per hour.

WYOMING WILDCAT FAILURES

Carbon County, Freezout Hills: National Associated Petroleum Co. 1 UPRR, NE SE SW 13-24n-80w, dry, TD 1,007 ft. Amsden 448 ft., Madison 622 ft., Cambrian 740 ft., pre-Cambrian 1,006 ft.

Cooper Cove: Stanolind Oil & Gas Co. 3 Johnson-Parkinson, SE SW NW 20-18n-77w, dry, TD 8,123 ft., Shannon 2,036 ft. Niobrara 3,130 ft., Frontier 4,075 ft. Muddy 4,735 ft., Dakota 4,845 ft., Morrison 4,943 ft., Sundance 5,302 ft., Jelm 5,370 ft., Chugwater 5,560 ft., Forelle 7,490 ft., Satanka 7,050 ft., Tensleep 8,077 ft.

COLORADO WILDCAT FAILURES

Douglas County, Cherry Prospect: National Associated Petroleum Co. 1 State, NE NW SE 36-9s-66w, dry, TD 9,670 ft. Laramie 2,022 ft., Fox Hills 2,473 ft. Pierre 2,880 ft., Pierre shale 3,870 ft. Niobrara 8,530 ft., Ft. Hays 8,805 ft., Codell 8,907 ft., Carlile 8,952 ft., Greenhorn 9,027 ft., Graneros 9,213 ft., "D" sand 9,304-9,313 ft., "G" sand 9,338 ft., Dakota 9,452 ft., Skull Creek 9,476 ft., Lakota 9,524 ft., Morrison 9,586 ft.

Logan County, Northeast Peetz: National Associated Petroleum Co. 1 Phelps, SW SE SW 23-12n-51w, dry, TD 5,160 ft. Niobrara 3,908 ft., Ft. Hays 4,202 ft. Greenhorn 4,463 ft., brown lime marker 4,617 ft., "D" sand 4,703 ft., "G" sand 4,767 ft., "J" sand 4,831 ft., Skull Creek 4,879 ft., "M" sand 5,020 ft., "O" sand 5,066 ft.

H. C. Arnold 1 Harriet Weidig, NW NW SE 21-7n-54w, dry, TD 5,266 ft., Niobrara 4,158 ft., Ft. Hays 4,484 ft., Greenhorn 4,722 ft., "D" sand 4,998 ft., "J" sand 5,094 ft.

Moffat County, Axial basin: Midwest Plumbing & Heating Co. 1 Government NE NE NE 30-5n-93w, dry, TD 3,735 ft. Frontier 2,400 ft., Dakota 2,818 ft., Morrison 2,898 ft., Entrada 3,255 ft., Sundance 3,482 ft.

Morgan County: Eddie Fisher and J & L Drilling Co. 1 Henry, SW SW SE 14-3n-56w, dry, TD 5,311 ft., Niobrara 4,278 ft. Ft. Hays 4,561 ft., Carlile 4,606 ft. Greenhorn 4,697 ft., Graneros 4,780 ft. "D" sand 5,038 ft., "J" sand 5,109 ft. base "J" 5,297 ft.

Rio Blanco County, Seeley Dome: G. L. Reasor 2 Burgess, C SL NE NE NW 26-3n-90w, shut down TD 4,937 ft., Morrison 4,575 ft., Entrada 4,753 ft., Navajo 4,881 ft.

Weld County, Antelope Creek: Amerada Petroleum Corp. 1 Bringelson, SE NW NW, 27-7n-58w, dry, TD 6,740 ft., Niobrara 5,505 ft., Timpas 5,750 ft., Greasewood 6,246 ft., Mowry 6,325 ft., Cloverly 6,505 ft., Morrison 6,724 ft.

South Buckingham: Ryan Oil Co. 1 Mitzell, SE SE SE 20-7n-60w, dry, TD 7,020 ft., Niobrara 6,170 ft., Ft. Hays 6,430 ft., Carlile 6,470 ft., Greenhorn 6,690 ft., "D" sand 6,880 ft., "J" sand 6,958 ft.

King-Warren & Dye et al., 1 State-SLW Ranch, C NE NE 18-5n-63w, dry, TD 7,218 ft., Hygiene 3,490 ft., Niobrara

6,427 ft., Tumpas 6,625 ft., Dakota 7,147 ft.

MONTANA WILDCAT SUCCESS

Dawson County, Richey area: Shell Oil Co. 1 NPRR, SE NW NW 19-23n-50e, TD 10,518 ft., PB 7,275 ft., IP 1,656 bbl. oil 24 hrs., Charles 6,695 ft., Mission Canyon 7,298 ft., Lodgepole 7,750 ft., Kinderhook 8,479 ft., Devonian 8,490 ft., Ordovician 9,775 ft., Cambrian 10,446 ft.

MONTANA WILDCAT FAILURES

Hill County, Signal Butte: E. O. Reickhoff 2 John Schnitzmeier, NE SW SW 14-35n-16e, shut down, TD 4,040 ft.

Treasure County, Hardin area: Glen McCarthy 2 Kendrick Cattle Co., C SW 26-3n-35e, dry, TD 7,010 ft., Lakota 5,273 ft., Morrison 5,330 ft., Sundance 5,480 ft., Rierdon 5,678 ft., Piper 5,880 ft., Chugwater 6,070 ft., Tensleep 6,178 ft., Amsden 6,209 ft., Charles 6,530 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Cheyenne County, East Dalton area: Charles D. Edmonson et al 1 Carl A. Baker SE SE SW 30-17n-49w, dry, TD 4,966 ft., "J" sand 4,517 ft., base "J" 4,584 ft., "M" sand 4,726 ft., "D" sand 4,786 ft., "R" sand 4,860 ft., "T" sand 4,895 ft., Morrison 4,960 ft.

Murphy area: Murphy Corp. 1 F. E. Davison, SW SW NE 1-16n-51w, dry, TD 5,423 ft., Niobrara 3,978 ft., Ft. Hays 4,234 ft., Codell 4,339 ft., Carlile 4,353 ft., Greenhorn 4,501 ft., Graneros 4,679 ft., "D" sand 4,788 ft., "J" sand 4,947 ft., base "J" 5,002 ft., Cloverly 5,141 ft., Morrison 5,363 ft.

Sinclair Oil & Gas Co. 2 Peterson, SE SE NW 32-17n-49w, dry, TD 4,729 ft., Niobrara 3,710 ft., Ft. Hays 3,960 ft., Codell 4,070 ft., Carlile 4,082 ft., Greenhorn 4,260 ft., first sand 4,519 ft., Muddy 4,664 ft., Skull Creek 4,707 ft.

UTAH WILDCAT FAILURE

Emery County, Last Chance: Byrd-Frost, Inc., 1 A. Rath, C NE NE 13-26s-6e, dry, TD 2,875 ft., Chinle 1,762 ft., Shinarump 1,851 ft.

NORTH DAKOTA WILDCAT SUCCESS

Williams County: Amerada Petroleum Corp. 1 Clarence Iverson, C SW SW 6-155n-95w, TD 11,955 ft., PB 8,560 ft., flowed 25 bbl. of oil per hour, 43° gravity, from Madison. Madison 8,292 ft., Madison pay 8,488 ft., Kinderhook 9,820 ft., Three Forks (Devonian) 9,922 ft., Jefferson (?) 10,110 ft.

Mississippi

Wilkinson County Wildcat Flows Oil From Wilcox

JACKSON.—Gulf Refining Co. 1 Crosby Lumber & Manufacturing Co., 15-4n-1w, Wilkinson County wildcat, flowed at the rate of 151 bbl. of 38°-gravity oil daily based on a 4-hour test.

Gage was made through ⅛-in. choke with flowing pressure of 550 psi. Production is from the Wilcox at 6,733-40 ft., and test seems to indicate that it is one of the better type sands in the Wilcox area.

First Wilcox production has been established in North Natchez field, Adams County, at Humble Oil & Refining Co. 1 Frank Junkin, et ux., 2-7n-3w. Hole was drilled to total depth of 10,489 ft., then plugged back and operator set 5½-in. casing to 4,370 ft. On drill-stem test of casing perforations at 4,309-11 ft., using ¼-in. chokes, gas was to the surface in 6 minutes and mud in 10 minutes. Through 10/64-in. choke, the well flowed at the rate of 132 bbl. of 39.7°-gravity oil per day with top pressure of 580 psi. The discovery well of North Natchez field, Humble 1 Giles, 4-7n-3w, was completed as a gas condensate producer from perforations at 10,154-60 ft. in the lower Tuscaloosa.

In Amite County, Humble has run 7-in. casing to 11,313 ft. in H. C. Spears, 27-1n-6e. Hole is bottomed at 11,747 ft. and during the past few days there have been rumors concerning shows encountered in the wildcat. However, reports indicate that casing was set as a protection string.

Union Producing Co. is still attempting to recover 3½-in. drill pipe that was lost in 1 J. T. Sanders, 22-15s-6e, Monroe County wildcat that blew out while being cleaned out. Operator ran 1⅝-in. pipe inside the 3½-in. drill pipe in the hole and established circulation, but lost the bottom two joints of the 1⅝-in. pipe.

MISSISSIPPI WILDCAT FAILURES

Adams County: Paul Ratcliff, Jr., 1 F. & L. Geddes unit, 14-5n-1w, dry, TD 6,657 ft.

Amite County: The California Co. 1 Coles unit U.S.A., 7-4n-3e, dry, TD 7,503 ft.

Jefferso nCounty: R. L. Lawrence and L. Cashion Co. 1 Carl Brown, 29-10n-2e, dry, TD 6,524 ft.

North Central Texas

Fisher County Gas Well Temporarily Out of Control

WICHITA FALLS.—R-H-K Drilling Co. and Noranda Oil Co. 1 T. W. Willingham, west outpost test to the Round Top field in Fisher County, started making from 3,000,000 to 10,000,000 cu. ft. of gas daily on drill-stem tests from 4,849 ft.

At total depth 4,977 ft. the well was temporarily out of control, blowing an estimated 50,000,000 to 60,000,000 cu. ft. of gas a day. According to reports, the well was about 100 ft. high on the reef structure to nearest wells in the Round Top field and 260 ft. high to The Texas Co. 1-C Stevens, farther west.

In Noland County, General Crude Oil Co. 1 E. Jordan, north of Blackwell, was dry at 6,607 ft. Last drill-stem test at 6,583-6,607 ft., open 1 hour, developed 300 ft. of sulfur and salt water. Top of the Ellenburger was 6,404 ft.

Seaboard Oil Co. 1-A Billie Hanks, northeast of Blackwell, found the Ellenburger at minus 3,668 ft., then plugged back to 5,243 ft. for testing.

Union Oil Co. of California 4 Campbell Estate prepared to core from 5,167 ft. Continental Oil Co.'s new test, the 1 Dan Earwood, 7 miles northeast of Blackwell in the H&TC Survey, was drilling ahead after running surface casing.

W. B. Hamilton 2 Mrs. G. Morgan, 11 miles west of Graham in Young County, completed as a Bend conglomerate discovery. Completion gage was 191 bbl. of oil a day through ¼-in. choke from pay at 4,226-32 ft.

In Cooke County, Fred Snuggs 1 Rosetta Underwood, J. C. McElroy Survey, flowed 192 bbl. of oil a day on ½-in. choke, to extend the Woodbine field 1½ miles southwest. Pay was between 3,898-3,920 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: Russell Maguire 1 Minnie Decker, SPRR Sur. 2, A-1,187, TD 5,743 ft., Ellenburger 5,620 ft., pay 5,725 ft., IP pumped 80 bbl. 45°-gravity oil.

Chas. E. Morrison 1 Prideaux-Sams, McMullen Sur. A-296, TD 3,651 ft., pay 3,640 ft., IP 68 bbl., 42°-gravity oil, open tubing, GOR 420 cu. ft.

Baylor County: C. J. Bohner 1-E Fayette CSL, TD 3,004 ft., pay 2,998 ft., IP pumped 18 bbl. 40°- gravity oil.

Eastland County: J. J. Lynn 1 Pippen, Sec. 3,170, TE&L Sur., TD 4,062 ft., elev. 1,570 ft., Ellenburger 4,036 ft., IP 101 bbl. 40°-gravity oil, 12/64-in. choke, TP 575 psi., GOR 840 cu. ft.

Throckmorton County: G. E. Kadane & Sons 1 Davis Confron, Sec. 1,620, TE&L Sur., TD 3,452 ft., elev. 1,376 ft., pay sand 3,444 ft., IP pumped 26 bbl. 41°-gravity oil.

Stonewall County: Skelly Oil Co. 1 C. E. Boyd, 47-D-H&TC, TD 6,050 ft., elev. 1,673 ft., Bend conglomerate 6,018 ft., perforated 6,021-47 ft., IP 182 bbl. 41°-gravity oil in 3 hr., ¾-in. choke, TP 250 psi., GOR 685 cu. ft.

Young County: Reno Oil Co. 1 McCracken, Blk. 1,913, TE&L Sur., TD 3,501 ft., pay 3,484 ft., IP 115 bbl. 40°-gravity oil, 16/64-in. choke, TP 40 psi., GOR 650 cut ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: E. B. Clark 1 Carrie Mahler, Lucien Hopson Sur., dry, TD 3,366 ft.

Clay County: Consolidated Oil Co. 1-B J. D. Avis, Blk. 10, Raines CSL, dry, TD 4,960 ft.

Pete Hall Drilling Co. 1 A. H. Jones, T. P. Duncan Sur. dry, TD 1,802 ft.

Cooke County: R. B. Hollandsworth 1 Lucy Stark, Hunt CSL, A-400, dry, TD 2,487 ft.

Eastland County: Midway Oil Co. 1 W. H. Grove, Sec. 473, SPRR, dry, TD 3,572 ft., elev. 1,481 ft., Caddo 3,389 ft., Lake sand 3,541 ft.

Fisher County: Continental Oil Co. 1 A. N. Noles, 32-2-H&TC, dry, TD 6,935 ft., elev. 2,010 ft., Ellenburger 6,834 ft.

Hamilton County: Prince Bros. Drilling Co. 1 H. Petrey, S. D. Felts Sur., dry, TD 3,480 ft., elev. 1,135 ft., Marble Falls 3,272 ft., Mississippian 3,363 ft.

Jack County: Cecil Jennings 1 W. E. Hunt, Jackson Sur., A-2,118, dry, TD 537 ft.

Russell Maguire 1 Dorcas, B. F. Ellis Sur., dry, TD 5,240 ft.

Jones County: Bay Petroleum Corp. 1 J. T. Beard, B. Trevine Sur. 190, dry, TD 2,336 ft., elev. 1,673 ft., Swastika 2,278 ft.

Joe E. Parris 1 J. L. Woodson, Sec. 30, D&DAL Sur., dry, TD 3,750 ft., elev. 2,000 ft., Flippen 2,160 ft., King 2,485 ft., Swastika 2,765 ft.

Earl Slick 1 A. R. Thommasson, Sec. 270, M. Northington Sur., dry, TD 5,505 ft.

Montague County: Dub-Wood Drilling Co. 1 Heaton Bros., O. Buckman Sur., A-73, dry, TD 1,801 ft.

Shackelford County: Fausten Properties 1 J. H. Grimes, 81-12-T&P, dry, TD 1,020 ft.

Stephens County: The Bay Petroleum Co. 1 L. G. Ledbetter, 28-6-T&P, dry, TD 3,703 ft.

J. E. Connally 1 E. S. Curry, Sec. 2,032, TE&L Sur., dry, TD 2,400 ft.

Stonewall County: Continental Oil Co. 1 C. Nichols, 339-D-H&TC, dry, TD 7,102 ft., elev. 2,002 ft., Ellenburger 6,795 ft.

Throckmorton County: Jennings Drilling Co. 1 Ella Andrews, Sec. 284, BBB&C Sur., dry, TD 4,965 ft.

Wilbarger County: Frank Wood Associates 1-UU Waggoner, H&GN Sur., dry, TD 2,105 ft.

Young County: Bridwell Oil Co. 1 F. M. Cullers, J. L. Hyatt Sur., dry, TD 3,680 ft.

H. D. Egger 1-B King, Blk. 298, TE&L Sur., dry, TD 3,133 ft.

W. T. Roberts 1 S. J. Jeffery, McFarland Sur., A-193, dry, TD 4,765 ft., Barnett shale 4,568 ft.

John H. Wilson 1-I Jeffery Estate, Sec. 52, TE&L Sur., dry, TD 890 ft.

South Louisiana

Production From Hackberry Completes Acadia Test

NEW ORLEANS—Sunray Oil Corp. 1 Fred Loewer, 45-8s-2e, Acadia Parish, has been completed for 209 bbl. of distillate plus 2,983,000 cu. ft. of gas daily through 10/64-in. choke. Gravity of the distillate is 48.5°. Production is through casing perforations at 11,178-85 ft. Flowing pressure on the tubing registered 5,850 psi.

Production is from the Hackberry formation. Two other gas-distillate zones were encountered in the venture from 10,647-79 ft. and 10,802-92 ft. The new field opener is 5 miles northeast of production in North Crowley field and 3 miles northwest of Branch field production.

In St. Landry Parish, Sohio Petroleum Co. 1 Thistlewaite Lumber Co., C NE NE 64-4s-4e, wildcat, flowed an estimated 1,750,000 cu. ft. of gas daily plus some distillate through 10/64-in. choke. Tubing pressure was 3,075 psi. Production is from perforations at 9,287-91 ft. On drill-stem test of these perforations, using ⅛-in. chokes, tubing pressure was 1,600 psi. after 7 minutes, 1,880 psi. after 31 minutes and 3,300 psi. after 4½ hours. This wildcat is bottomed at 12,505 ft. with production string cemented at 11,778 ft.

A new oil field seems assured at Caroline Hunt Sands 1 Sweetlake Land & Oil Co., 9-12s-7w, wildcat west of Chalkley in Cameron Parish. The well is flowing clean, pipe-line oil from perforations at 9,384-89 ft. The venture is bottomed at 11,932 ft. with 9⅝-in. casing cemented at 9,550 ft. Electric log indicated a sand, possibly oil, from 9,380-98 ft.

Magnolia Petroleum Co. is conditioning hole and preparing to drill ahead below 17,784 ft. at 1 Ragley Lumber Co. "C," C SE NW 29-5s-7w, Allen Parish wildcat which established a new drilling depth record for Louisiana. Venture is located approximately 1½ miles southeast of production in Hurricane Creek field in Beauregard Parish.

The California Co. has completed a new oiler on the southeast flank of English Bayou field, Calcasieu Parish. From perforations at 7,053-59 ft., the well, 1 Ida Belle Castle et al., flowed 114 bbl. of oil per day through 16/64-in. choke. Gravity of the oil is 42°.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

St. Martin Parish: Oil discovery "Happy Town"—The Texas Co. B-1 Iberville

Land Co., 84-7s-8e, TD 10,623 ft., perf. 9,654-64 ft., IP: 136 bbl. oil per day, 36°-gravity, 10/64-in. choke, TP 800 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Beauregard Parish: The Texas Co. 1 Isabel Crawford Logan, 4-3s-10w, dry, TD 1,506 ft.

Cameron Parish: Jay Simmons 1 J. T. Miller Estate, 39-15s-5w, dry, TD 8,675 ft.

Rapides Parish: Bates & Cornell 1 Walter E. Carter, 63-4n-2w, dry, TD 7,000 ft.

St. Landry Parish: Sun Oil Co. 1 Higginbotham Unit 1, 38-7s-5e, dry, TD 10,500 ft.

Louisiana-Arkansas

Belah Field Gains Two Confirmation Oil Wells

SHREVEPORT.—Justiss Mears Oil Co., discovery operators of the new Belah field, LaSalle Parish, North Louisiana, have assured this field two confirmatory producers in the Wilcox (Eocene) sand. Some sources regard this discovery as a southeastward extension to Trout Creek oil field, also productive from the Wilcox.

Official potential was reported last week for the discovery well, their 1 W. L. Valentine et al, SE SE 19-8n-3e, which flowed 216 bbl. of 39°-gravity oil per day through a 10/64-in. choke. Initial tubing pressure was 760 psig., casing pressure 1,395 psig. Gas-oil ratio was 444 cu. ft. per barrel. Total depth is 4,140 ft.

Last week, same interests set pipe on bottom at 3,694 ft. at the east 40-acre offset, 1 T. E. Windham, SW SW 20-8n-3e, after logging Wilson sand carrying saturation from 3,678-94 ft.

At the diagonal northeast offset to the discovery, same operators' 1 Corley logged Wilcox sand from 3,684-94 ft., total depth, and cemented 7-in. casing on bottom. Location is 1,974 ft. from the south line and 672 ft. from the west line of 20-8n-3e.

Arkansas.—An 11,150-ft. test to the Smackover lime for the Springhill seismic prospect straddling the Arkansas-Louisiana border was announced last week. Shell Oil Co., operators, and Mid-Continent Petroleum Corp. have staked location for their 1 Browning-Burns, 660 ft. north and west of the southeast corner of fractional section 12-20s-23w, 1 mile northeast of the town of Springhill, La., but in Columbia, South Arkansas.

Shell holds 1,500 acres on the Columbia County, Arkansas, side and 4,000 acres on the Webster Parish, Louisiana, side of the structure. Other companies holding lease protection including Woodley Petroleum Co., Murphy Corp., Hunt Oil Co. and Pan Am Southern Corp.

LOUISIANA WILDCAT SUCCESSES

Caddo Parish: Houston Oil Co. 1 Ellerbe, 1,980 ft. N and 1,997 ft. W Sec. 27-18n-14w, 12,000 M.c.f. open flow gas from perforations at 6,222-38 ft. in Travis Peak, 9,094 ft.

De Soto Parish: Mid-Century Oil & Gas Co. 1 Shirley Williams, 600 ft. S and 760 ft. W NEc 7-13n-15w, 13,500 M.c.f. open flow from perforations at 5,360-68 ft. in Rodessa (Gloyd), TD 5,379 ft.

LOUISIANA WILDCAT FAILURES

Bossier Parish: J. R. Butler et al 1 Zetta Sherrill, C SW SE 12-19n-12w, dry, TD 4,873 ft.

Caddo Parish: Isbrandtsen Co. 1 A. R. Fry, 1,023 ft. N and 1,415 ft. W SEc 29-15n-11w, dry, TD 3,015 ft.

Isbrandtsen Co. 2 A. R. Fry, 1,265 ft. N and 870 ft. W SEc 29-15n-11w, dry, TD 1,150 ft.

Grant Parish: R. W. Norton, Jr. et al 1 Edenborn, C NE NE 34-7n-3w, dry, TD 5,323 ft.

La Salle Parish: D. H. Davis et al 1 Olla

State Bank, SE SE NW 21-11n-3e, dry, TD 4,010 ft.

ARKANSAS WILDCAT FAILURE

Clark County: Ed Ren Oil Co. 1 T. G. Clark, SE NE SW 33-9s-21w, dry, TD 920 ft.

Oklahoma

Shawnee Wildcat Finds Hunton Oil Indications

VIERSEN & COCHRAN and Lon B. Turk and associates have a potential Hunton lime discovery at their 1 Etta Shaw, NW SW SE 4-10n-4e, northeast of Shawnee, Pottawatomie County. Drilled as a ¾-mile southeast outpost to the Shawnee pool, the well passed up the Earlsboro sand producing zone of that pool, and logged Hunton at 5,301-30 ft. A drill-stem test in the latter zone with tool open 2 hours flowed gas in 95 minutes estimated at 100,000 cu. ft. per day initially, and recovered 50 ft. of clean oil and 20 ft. of oil-cut mud in the breakdown. Indicated bottom-hole pressure was 1,275 psi. Hunton showings have been passed up for the time being with hole being deepened to look at the second Wilcox potentialities. Deepening, operators logged Sylvan at 5,332 ft. and Viola at 5,428 ft.

Revival of the abandoned Southeast Lamont pool in Grant County is in prospect at Beach & Talbot and associates 1 Muegge, SW SE NW 16-25n-3w, which not only found promising oil and gas showings in Simpson dolomite, former producing horizon in the pool, but also uncovered indications of good gas-distillate production in the deeper second Wilcox zone.

In the Simpson dolomite, topped at 5,310 ft., a drill-stem test at 5,328-44 ft. had gas at the surface in 7 minutes and oil and water in 25 minutes. Gas flow was estimated at 2,000,000 cu. ft. per day, oil at 25 bbl., and water at 5 bbl. per hour. The second Wilcox zone was tested at 5,345-53 ft., getting gas in 5 minutes and distillate in 55 minutes. The breakdown yielded 3,000 ft. of distillate. At latest report, hole was being cored ahead in the latter zone.

The east flank of the Lucien field, Noble County, where active development of multi-zone production is under way, has added another good Misener well. It is Thomas N. Berry & Co. 2 Wolff, NW SW SE 22-20n-2w, which flowed 320 bbl. of clean oil in 24 hours through 20/64-in. choke. Production is from open hole at 5,029-41 ft. The well is a location north of 1 Wolff, recently completed flowing 160 bbl. daily from Perry sand at 3,672-88 ft. It is a mile northeast of nearest Misener production.

Testing is under was at Gulf Oil Corp.'s deep wildcat, 1 Sprowls, C NW NW 28-13n-23w, south of Cheyenne, southern Roger Mills County, in the extreme western part of the state. Initial packer tests with casing perforated at 10,400-10,660 ft. got only a small volume of gas, flowing by heads after 45 minutes, and a recovery of 1,620 ft. of gas-cut mud. The well was open 4 hours. Hole had been plugged back to 12,575 ft. after casing had been run to 12,631 ft. Total depth was 14,503 ft.

Stanolind Oil & Gas Co. has gone back into its 1 Shaffer, NW NW SW 1-7n-16w, recently abandoned wildcat northeast of Gotebo, northern Kiowa County, in the southwestern part of the state, and in a drill-stem test at 5,547-63 ft. got a gas flow estimated at 3,000,000 cu. ft. per day. Tester was open 3 hours. Gas was at the surface in 4 minutes, and in the final 90 minutes the well sprayed mud. Recovery in the breakdown was 180 ft. of gas-cut mud. Shut-in, the well built up a pressure of 2,450 psi. in 30 minutes. Hole had been deepened to 5,902 ft. from its formerly abandoned total depth of 5,880 ft. After deepening, hole bridged at 5,630 ft. and was redrilled to 5,763 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Grady County: Little Nick Oil Co. 4 Glover, NE NE NE 27-5n-8w, flowed 20 M.c.f. gas at 8,963-90 ft., TD 15,638 ft.

Hughes County: Davidor & Davidor 1 L. Rogers, SW SW NE 24-9n-8e, flowed 80 bbl. 31.7°-gravity oil from Misener at 3,999-4,008 ft., TD 4,008 ft.

Logan County: Midstates Oil Corp. 2 F. H. Hower, SW NE SW 29-15n-2w, flowed 35 bbl. distillate and 11.7 M.c.f. gas from Bartlesville at 5,865-70 ft., TD 5,874 ft.

OKLAHOMA WILDCAT FAILURES

Garvin County: E. Jordan 1 L. L. Patton SE SE SW 13-4n-3e, dry, TD 2,849 ft.

Grant County: Toklan Producing Co. and Lucey 1 Bernice Duringer, SW NW NE 8-28n-4w, dry, TD 5,324 ft.

Kay County: K. A. Ellison et al 1 Bain NE NE SW 4-28n-4e, dry, TD 3,712 ft.

W. H. Martgan 1 Payne, NW NW SE 31-28n-5e, dry, TD 3,047 ft.

D. W. Cotton 1 Warren, SW SE NW 33-29n-4e, dry, TD 3,298 ft.

Logan County: Mazda Oil Corp. et al 1 Herwig, SW SW NW 9-15n-2w, dry, TD 6,165 ft.

Major County: Sinclair Oil & Gas Co. 1 Ray Campbell, C NE NW 36-23n-16w, dry, TD 8,923 ft.

McClain County: Sinclair Oil & Gas Co. 1 George Bennett, NW SE NW 21-5n-2w, dry, TD 9,013 ft.

Noble County: Bay Petroleum Corp. and Big Chief Drilling Co. 1 Snallow, SW NW NW 11-22n-1e, dry, TD 4,570 ft.

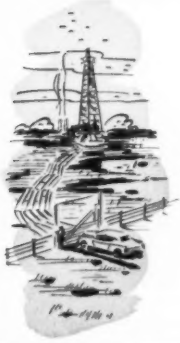
Osage County: Forrest H. Lindsay 1, NW NW SW 3-23n-7e, dry, TD 2,883 ft.

Stephens County: Hamner and Chadwell 1 Wermachcony, S2 SW SE 2-1s-9w, dry, TD 2,720 ft.

Mack Oil Co. 1 L. L. Humphreys, NE NW SW 34-2s-5w, dry, TD 4,216 ft.

Wm. H. Atkinson 3 Edwards, SE NW SE 10-3s-6w, dry, TD 2,295 ft.

The Drilling Contractor's Superintendent

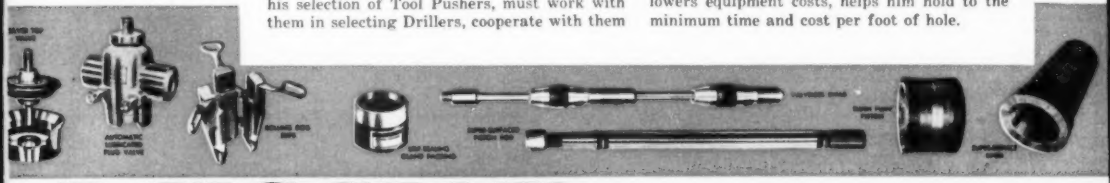


Nearly 90% of the 44,000 wells to be completed this year, will be drilled by Drilling Contractors. Consider the problems to be solved, the complexities to be faced, and the responsibilities involved in so huge a schedule of operations, and you will gain some idea of the importance of the Contractor's chief field officer . . . the Drilling Superintendent.

A Drilling Superintendent will in some cases supervise fifteen or more drilling rigs representing, in rotary territory, an investment of from 2 to 10 million dollars. He is a drilling expert of long experience.

Since every oil well represents a different and often a unique problem, the Superintendent's job is multiplex. He must be expert in his selection of Tool Pushers, must work with them in selecting Drillers, cooperate with them in planning each well. He must know rigs and equipment, be ready with sound advice on any phase of the job, assist in handling such problems as wild wells, difficult fishing jobs, etc. He must be familiar with the many special organizations offering logging, directional drilling, fishing services, etc.; must understand all completion techniques. In a word, he must be a past master in every phase of well drilling.

Fine equipment is one of the basic factors which enable him to establish a reputation for fast, straight hole. For 25 years MISSION has been one of his valued allies in this department. He has found MISSION equipment unsurpassed in efficiency, dependability, and durability . . . has found that it reduces hazards, lowers equipment costs, helps him hold to the minimum time and cost per foot of hole.



MISSION MANUFACTURING CO.

Mission Mfg. Co., Houston, Tex. Export 30 Rockefeller Plaza, New York. Europe: London, England

WHY STURDYBILT PREFABRICATED HOUSES FOR THE OIL FIELDS?

STURDYBILT Houses have ALL the advantages of conventional houses, and NONE of the disadvantages. STURDYBILT Houses are weather-tight, constructed to last, and are roomy, comfortable and beautifully designed.

STURDYBILT Houses, because they are prefabricated at the factory, can be moved to any site, erected in days instead of weeks or months, and are easily taken down and transported to another location with little or no loss of material.

Investigate STURDYBILT Prefabricated Demountable Houses today.

MANUFACTURERS OF SPECIAL MILLWORK, DISTRIBUTORS OF JOHNS-MANVILLE BUILDING MATERIALS; CURTIS WOODWORK

STURDYBILT

PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

Central Area

ILLINOIS

Production of the O'Hara pay zone of the newly opened pool in the Sumpter area, 3 miles northeast of Carmi, White Country, is being extended southwestward by George & Wrather and associates 1 Winter-Botsch Community, NE SE NE 31-4s-10e. The well, a diagonal offset to the discovery well, (1 Reuben Winter), completed in the same pay zone, swabbed at an average rate of 17 bbl. of oil per hour following a 3,000-gal. acid application. Prior to acidization, it swabbed 1 bbl. of oil per hour. Pay is at 3,108-24 ft. with surface elevation of 375 ft. as compared with 3,118-25 ft. in the discovery well with surface elevation of 378 ft.

The well, the first confirmation producer for the O'Hara pay, is the third for the area. The second well, 2 Reuben Winter, NE SW NW 32-4s-10e, a location diagonally southeast of the discovery well, was completed in Aux Vases sand at 3,022-38 ft. flowing initially at the rate of 128 bbl. daily. The discovery well also is a potential producer in the Aux Vases sand, in which excellent showings were obtained, but operators elected to complete it only in the lower pay.

Although extended to the southeast and the southwest, the pool apparently has been defined to the northwest, where the above operators' 3 Reuben Winter, NE NE NE 31-4s-10e, proved dry after drilling to 3,164 ft. Two locations to the south of 2 Reuben Winter, these operators are testing their 1 Rose-Campbell-Winter, NE NW SW 32-4s-10e, which encountered showings in Aux Vases sand at 3,021-35 ft. Currently drilling is 5 Reuben Winter, NE NW NW 32, a location northwest of the discovery well.

INDIANA

Indiana Farm Bureau is opening a new and deeper pay zone, the Aux Vases sand, for the recently discovered Belknap East pool, 2 miles west of Evansville, in western Vanderburgh County, where its 1 Schwitz, SW SW NW 16-6s-11w, logged excellent saturation in that pay at 2,546-53 ft. A 60-minute drill-stem test of that interval recovered 1,770 ft. of clean oil with bottom-hole pressure of 850 psi. Casing has been run to 2,545 ft. The three wells already completed in the pool produce from the Biehl sand. The new prospective Aux Vases well is a 660-ft. location north of production.

Benedum & Trees and Jack V. Canterbury 1 Smith & Sons, SE NW SW 1-8s-11w, 8 miles south of Evansville in the extreme southern tip of Vanderburgh County, just across the Ohio River from Henderson, Ky., is showing for a small well after drilling plug and filling 150 ft. with oil. At latest report, operators were running swab to clean out test. No estimate of productivity is available as this is written. The well is 3 miles from nearest Kentucky production and 7 miles from other Indiana production. Prospective pay zone is McClosky lime at 2,397-2,406 ft. with hole open below 2,390 ft.

WESTERN KENTUCKY

Production of the Spottsville pool, a mile southwest of Spottsville, Henderson County, is being extended a half mile to the northeast where Felmont Oil Corp. swabbed 296 bbl. of oil in the first 24 hours while testing its Aux Vases pay zone at 2,172-80 ft. Pay zone was treated with 2,700 gal. of acid. Total depth is 2,380 ft. Casing was run through the pay to 2,230 ft. and perforated.

EASTERN KENTUCKY

In Big Sandy gas field, Pike County sector, Kentucky West Virginia Gas Co. has completed 6023 J. Lee Ferguson for a small gas well making 94,000 cu. ft. of gas daily from Devonian black shale at a total depth of 3,946 ft.

In Letcher County, Kentucky West Virginia Gas Co. will attempt to extend production of Big Sandy gas field into that county which heretofore has had no commercial production. Test is 6037 W. R. Polly about 1½ miles from established production in neighboring Knott County. Well is currently drilling at 625 ft.

MICHIGAN

McClure Oil Co., Basin Oil Co. and Swan-King Oil Co. 1 Adair, SE SE NW 13-16n-10w, Green Township wildcat, Mecosta County, was completed in the Traverse as a new oil discovery, and was being flowed at a restricted rate of 75 bbl. of oil a day, after acid treatment with 750 gal. Well was showing an average water-cut of 7 per cent, but this water, believed to be coming from the oil pay, was reported to be decreasing. Wildcat was bottomed out in Traverse oil pay at 2,999 ft. and well swabbed oil at the rate of 1 bbl. an hour natural.

Another good Detroit River sour zone oil producer was added in the Billings field (Dundee and sour zone), Gladwin County, at Chapman Oil Co. 1-A McCrandall, SW SE SW 2-17n-1e. This new producer was rated good for 150 bbl. of oil a day on initial tests following acid treatment to an oil pay from 4,073-86 ft. with 1,000 gal. Hole was bottomed out at 4,092 ft. Well flowed 108 bbl. of net oil first 22 hours after treatment, restricted, and 295 bbl. net, restricted, first 48 hours.

ILLINOIS SUCCESSFUL WILDCAT

Christian County: The Texas Co. 1 Kemmerer Orphanage, SE NW SW 14-12n-1e, IP 26 bbl., Devonian 2,632-47 ft., TD 2,720 ft. (discovery well Assumption South pool).

ILLINOIS WILDCAT FAILURES

Bond County: T. Meyers 1 Lurkin, NE NW NE 31-5n-2w, dry, TD 2,445 ft.

Edwards County: J. W. Everhart 1 Gill, NW SW SW 21-1n-10e, dry, TD 3,335 ft.

Hamilton County: T. H. Lindsay et al., 1 McClure, N½ SE NE 21-4s-6e, dry, TD 3,531 ft.

Jefferson County: Halbert & Strickland 1 Mannen Community, SW NW NE 17-3s-1e, dry, TD 2,001 ft.

Lawrence County: W. R. Murphy 1 Pinkstaff heirs, SE SW SE 2-4n-11w, dry, TD 1,670 ft.

Madison County: J. W. Everhart and Ashland Oil & Refining Co. 1 Landolt, NE SE SW 24-5n-5w, dry, TD 2,063 ft.

Marion County: Pep Drilling Co. 1 Blankenship et al., NE NE SW 17-3s-1e, dry, TD 2,908 ft.

Wayne County: George & Wrather 1 Murphy, SW NE SE 6-3s-9e, dry, TD 3,544 ft.

INDIANA SUCCESSFUL WILDCAT

Gibson County: F. B. Murta 1 Montgomery, NE NW SE 5-3s-11w, IP 60 bbl., Cypress 2,031-46 ft., TD 2,046 ft. (extension Owensville East pool).

INDIANA WILDCAT FAILURES

Gibson County: Barron Kidd 1 Moore, SW SW NE 1-2s-10w, dry, TD 1,888 ft.

Morris Drilling Co. 1 McEllhiney, SW NE NW 12-2s-10w, dry, TD 1,900 ft.

Posey County: National Associated Petroleum Co. 1 Wilson-State, SW SW NW 6-6s-14w, dry, TD 2,880 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: Stanley Lambert 1 Farley, W½ NW NW NW 23-Q-25, IP 126 bbl., McClosky 2,290-94 ft., TD 2,294 ft. (extension Zion pool).

WESTERN KENTUCKY WILDCAT FAILURE

Webster County: Ralph Halbert 1 Clark, S½ SW SE NE 7-N-24, dry, TD 2,609 ft.

MICHIGAN SUCCESSFUL WILDCAT

Mecosta County, Green Township: McClure Oil Co., Basin Oil Co. and Swan-King Oil Co. 1 Adair, SE SE NW 13-16n-10w, Traverse lime 2,980 ft., oil pay 2,998-99

"The colonel refuses to lease unless we drill to the Mississippian instead of the Pennsylvanian!"

ft., 75 bbl. oil, plus 7 per cent water, pinched, TD 2,999 ft.

MICHIGAN WILDCAT FAILURE

Van Buren County, Decatur Township: L. C. MacGregor 1 Gibson, SW NW SW 3-4s-14w, Traverse lime 1,037 ft., dry, TD 1,066 ft.

California

Santa Clara Valley Area Discovery Being Completed

LOS ANGELES.—A new oil discovery was in process of being completed midway between Honor Rancho and the new Castaic Hills field in the upper Santa Clara Valley region of Los Angeles County.

The wildcat, The Texas Co. 1 Honor Rancho-2 in 36-5n-17w, and about ¾ mile southeast of the Ted Sterling discovery, on two formation tests flowed 33°-gravity oil at the rate of 800 and 450 bbl. daily. The first test was at 5,838-69 ft. while the second was at 5,875-5,950 ft. Following the tests, 7-in. casing was set at 5,835 ft.

Production is believed to be from the same Miocene sand as was opened at Sterling Oil Co. 1 Rynne-Fisher, which was completed at 4,642-96 ft. for 233 bbl. daily, indicating that Castaic Hills may be California's most important discovery of 1951. Further light on its importance will be gained from two tests drilling between the two wells. North of The Texas Co. wildcat ¼ mile, George Terry 1 Eskridge was drilling at 4,229 ft. About ¼ mile south of the Sterling discovery, Richfield Oil Corp. 83-35 Golden was below 5,500 ft.

In the Goose Slough area of Kern County, San Joaquin Valley, The Texas Co. also appeared to be on the verge of another oil discovery. Its wildcat 1 K.C.L.-Goosloo, in 20-29s-27e, and 8 miles west of Greeley production, yielded some 1,740 ft. of oil on a formation test at 10,039-73 ft. Casing was being set at last reports. Two 10,000-ft. dry holes have been drilled about ½ mile northeast of 1 Goosloo but otherwise the area within about a 2-mile radius is untested.

About 1 mile west of The Texas Co.'s 1 George discovery at Arvin and an equal distance south of its extensioner 1 Kern Valley, Havenstrite Oil Co. 1 Richards was in process of completion. Located in SW NE 22-31s-29e, the Havenstrite wildcat was running tubing after 7-in. casing had been landed at 6,958 ft., total depth.

In Cuyama Valley and approximately 1½ miles southeast from South Cuyama production, Richfield Oil Co. was preparing to run a formation test at its 1 J. G. James. Drilled to 11,336 ft., hole had been plugged back to 10,605 ft. where 7-in. casing was landed. The interval to be tested was through perforations at 10,519-10,605 ft. Location of the wildcat is NW SE 9-9n-26w.

Two other closely watched wildcats were The Texas Co. 1 S.M.L. & C. Co. in the Sumner Ranch area of San Luis Obispo County, and the same operator's 1 O'Connell in the Hollister area of San Benito County. At the former casing was set at 9,196 ft., total depth, after a formation test was run at 8,259-9,196 ft. Its location is 2-32s-19e.

The Texaco Hollister wildcat, 14-12s-4e, has shown promise of being a small gas well. Drilled to 7,418 ft. and plugged back to 6,370 ft., the wildcat has been flowing gas at the daily rate of about 50 M.c.f. on tests made during the past 2 weeks. While 1 O'Connell may not make a commercial well its shows have been sufficiently of interest for General Petroleum Corp. to announce it will drill its 1 O'Connell in 11-12s-4e.

CALIFORNIA WILDCAT FAILURES

Fresno County, Clovis area: Long & Hedges 2-18 "Well," 18-12s-21e, dry, TD 446 ft., elev. unreported.

Imperial County, Calexico area: The Texas Co. 1 Jacobs NCT-1, 18-17s-14e, dry, TD 7,505 ft., elev. 10 ft.

Kern County, McKittrick area: Bender-Stansbury-Webb 2 Anderson, 15-30s-21e, dry, Phacoides sand 5,580-5,600 ft., TD 8,205 ft., elev. 1,810 ft.

Salt Creek area: Western Petroleum Co. 65 Ferguson-Western, 30-29s-21e, dry, TD 2,032 ft., elev. unreported.

Tejon Hills area: Max N. Hammerling 1 Harp & Brown, 23-11n-18w, dry, granite 630 ft., TD 926 ft., elev. 1,210 ft.

Los Angeles County, Canoga Park area: Canoga Oil Co. 5 Knapp, 4-1n-17w, dry, TD 276 ft., elev. 1,045 ft.

Ridge Basin area: Continental Oil Co. 1 Elbe-U.S.L., 20-7n-17w, dry, TD 5,379 ft.

Monterey County, Oasis area: The Texas Co. 1 Pettitt, 24-20s-7e, dry, TD 4,033 ft., elev. 550 ft.

Peachtree Valley area: Union Oil Co. 1 Mee, 11-20s-10e, dry, TD 6,010 ft., elev. 1,235 ft.

San Ardo area: Wilshire Oil Co. 71-28 Hunter-Dryden, 26-23s-10e, dry, TD 5,052 ft., elev. 775 ft.

Riverside County, Elsinore area: A. J. St. Pierie 1 St. Pierie, 26-5s-5w, dry, TD 950 ft., elev. 1,500 ft.

San Joaquin County, Tracy area: Seaboard Oil Co. 1 Mary Simos, 8-2s-5e, dry, TD 4,692 ft., elev. 15 ft.

Santa Barbara County, Corral de Quati area: Shell Oil Co. 2 Orton, 27-7n-30w, dry, Monterey 3,383 ft., TD 6,185 ft., elev. 855 ft.

Santa Clara County, Moody Gulch area: Los Nietos Co. 1 Holy City, 9-9s-1w, dry, TD 4,659 ft., elev. 1,210 ft.

Solano County, Kirby Hills area: Shell Oil Co. 1 Shell Trico Unit-1, 19-4n-1e, dry, TD 7,828 ft., elev. 20 ft.

Ventura County, Camulos area: General Petroleum Corp. 1 Camulos, 21-4n-18w, dry, TD 9,138 ft., elev. 650 ft.

Cuyama Valley area: E. B. Stone 1 "Well," 30-9n-23w, dry, TD 255 ft., elev. 3,563 ft.

THE OIL AND GAS JOURNAL

"Do we have to do this every morning—just because he's going back in the Army in a couple of weeks?"

Appalachian-Ohio

Garrett County Well In Maryland Yields Gas

PITTSBURGH.—In Garrett County, Maryland, New York State Natural Gas Corp. 1-N-240 John K. Shaw, elevation 2,438 ft., reported 260,000 cu. ft. of gas after acidizing. Tully 3,240 ft., chert 3,790 ft., gas 3,818 ft., Oriskany sand 3,904 ft., gas 3,940 ft. and 3,984 ft., total depth 4,007 ft.

The 1-N-229 J. W. Bolyard resulted in a dry hole, Tully 3,744 ft., total depth 5,015 ft.

Cumberland & Allegheny Gas Co. 1 C. C. Mason, elevation 2,427 ft., reached the Onondaga at 3,692 ft., gas 3,749-3,779 ft., the Oriskany at 3,848 ft., gas 3,983 ft., testing 205,000 cu. ft. Drilling is at 3,945 ft.

Eberly & Snee 2 Eli Beechie is shut down at 4,380 ft., to acidize. Gas was encountered at 4,066-4,106 ft. Roy Fletcher is running the casing in 1 A. W. Killiuss at 3,756 ft.

Union district, Putnam County, West Virginia, Spartan Gas Co. completed 1 H. A. Null et al, gaging 1,800,000 cu. ft. gas in the Brown shale, total depth 3,722 ft.

Portland district, Preston County, Hope Natural Gas Co., deep test, 9665 J. Paul Martin, elevation 2,308 ft. Chert 5,223 ft. reported gas testing 179,000 cu. ft. at 5,258, 5,282-5,288 and 5,342 ft. The 9673 Nina Kay, elevation 2,296 ft., is again fishing and is at a depth of 4,669 ft. The 9676 Sarah J. Creamer, elevation 2,970 ft., is drilling at 3,170 ft. and 9694 Leonie Burrous, elevation 2,633 ft., ran 7-in. casing at 1,321 ft. Manufacturers Light & Heat Co. 4116 Enzer & Annie E. Whitehair, elevation 2,209 ft., is drilling at 4,568 ft.

St. George district, Tucker County, Lawrence Parshall 1 Floyd Stahl et al, elevation 1,850 ft., is drilling at 2,313 ft.

Beaver Pond district, Mercer County, United Fuel Gas Co. 6478 A. W. Hicks, elevation 2,834 ft., has resumed drilling and is at a depth of 8,117 ft.

MARYLAND WILDCAT SUCCESS

Garrett County: New York State Natural Gas Corp 1-N-240 John K. Shaw, elev. 2,438 ft., 260,000 cu. ft. gas, Tully 3,240 ft., chert 3,790 ft., gas 3,818 ft., Oriskany sand 3,904 ft., gas 3,940 ft. and 3,984 ft., TD 4,007 ft.

MARYLAND WILDCAT FAILURE

Garrett County: New York State Natural Gas Corp. 1-N-229 J. W. Bolyard, dry, Tully 3,744 ft., TD 5,015 ft.

OHIO

Roy Proffitt et al. has drilled through the Oriskany sand in the semiwildcat on David Fleming, Section 9, Lebanon Township, Meigs County. The sand, badly broken, was reported at 4,223-30 ft. with 30,000 cu. ft. of gas. The sand was shot and gaged 100,000 cu. ft. of gas 16 hours later, and will be tubed.

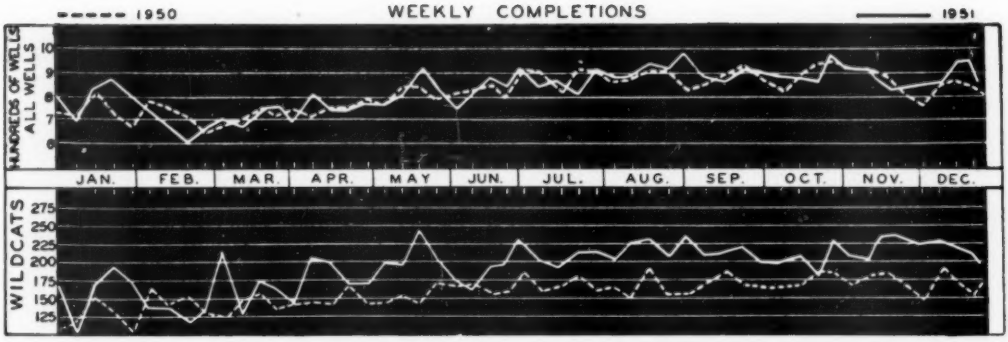
Roy Weed et al. 1 Dr. Lawrence, Section 32, Harrison Township, Perry County, gaged 375,000 cu. ft. of gas with a small showing of oil natural. No increase was noted in the oil after a 60-qt. shot, and the well was shut in at 500,000 cu. ft. of gas.

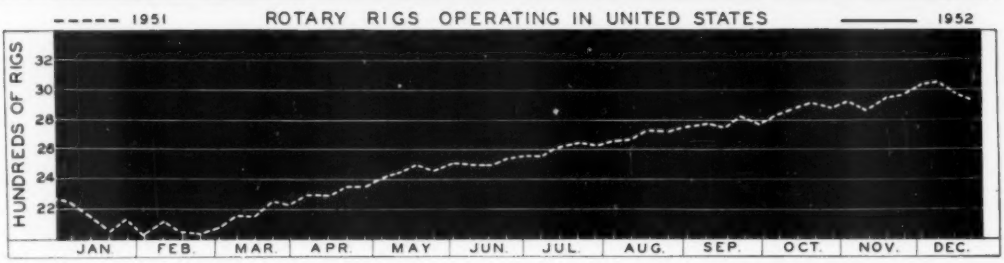
Ridgeway and Upham have started drilling in their stepout on the Muskingum Conservancy tract in lot 6, New Castle Township, Coshocton County. In the southwest part of the township, eight wells are drilling and eight more are ready to start, all in or surrounding New Castle pool.

Ohio Fuel has made a location for a wildcat on Frank Lenner in lot 18, Ridgeville Township, Lorain County, and a location for another on T. C. Herwig in lot 87, Montville Township, Lorain County.

OHIO SUCCESSFUL WILDCAT

Muskingum County, Cass Township: Mutual Oil & Gas Co. 1 John Scarpellini, lot 16, Clinton 3,620-60 ft., 590,000 cu. ft., TD 3,676 ft.





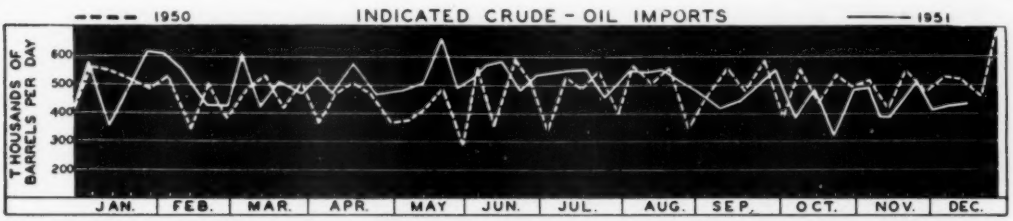
CURRENT STATISTICS

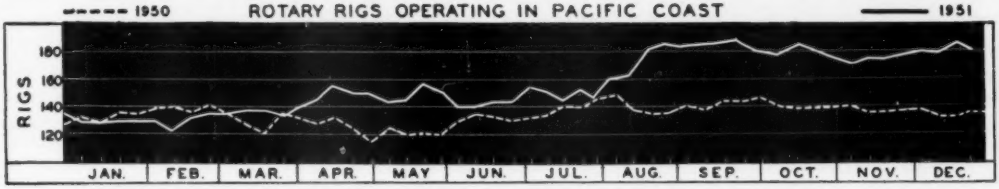
EXPLORATION

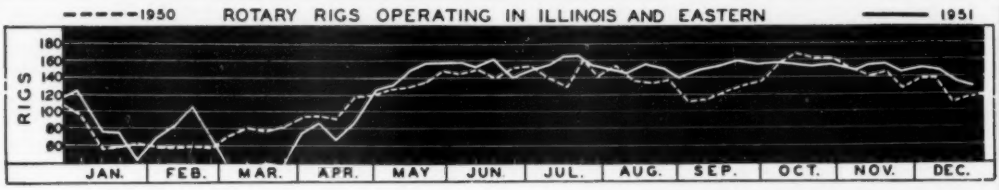
WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED DECEMBER 29, 1951

	Total of all wells					Dec. 29		Wildcat completions and discoveries									
								Cumulative total, 1951									
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	11	5	0	*6	16,400	643	659	0	0	0	0	0	0	0	0	0	0
Pennsylvania	33	17	4	†12	44,440	1,459	1,308	0	0	0	0	0	0	0	2	2	4
West Virginia	14	0	14	0	40,092	611	653	0	0	0	0	0	0	0	9	4	13
Ohio	13	2	6	†5	33,005	972	1,017	0	0	0	0	0	1	0	6	27	34
Indiana	7	3	0	4	14,331	1,352	1,539	1	0	0	3	4	63	0	3	479	545
Kentucky	9	2	5	2	20,934	1,277	1,147	1	0	0	1	2	44	0	2	220	266
Illinois	21	8	0	13	58,630	2,327	2,845	1	0	0	8	9	100	0	0	717	817
Michigan	5	3	0	2	11,251	747	885	1	0	0	1	2	18	0	6	311	335
Kansas	122	60	4	58	417,365	4,464	3,984	2	0	1	29	32	193	1	13	908	1,115
Nebraska	4	1	0	3	20,068	239	148	0	0	0	3	3	20	0	3	117	140
Oklahoma	109	62	5	42	410,480	5,572	5,465	1	0	2	13	16	183	5	23	731	942
Texas	297	196	13	88	1,495,335	16,638	16,587	14	0	2	56	72	750	54	131	3,475	4,410
North Central (Dist. 7-B & 9)	70	32	0	38	237,805	5,025	5,061	7	0	0	23	30	370	3	20	1,491	1,884
West (Dist. 7-C & 8)	117	100	1	16	667,834	5,115	5,002	3	0	0	11	14	180	10	9	647	846
Panhandle (Dist 10)	16	8	6	2	58,605	724	889	0	0	0	1	1	2	0	0	34	36
Eastern (Dist. 5 & 6)	23	11	1	11	136,589	1,149	1,164	0	0	0	8	8	10	9	2	234	255
Gulf Coast (Dist. 2 & 3)	35	26	2	7	213,972	2,314	2,322	2	0	1	1	4	97	22	61	480	660
Southwest (Dist. 1 & 4)	36	19	3	14	181,066	2,311	2,149	2	0	1	12	15	91	10	39	589	729
Louisiana	55	33	6	16	317,055	2,224	2,452	1	0	1	9	11	47	10	9	312	378
Northern	34	19	4	11	109,607	1,235	1,324	0	0	1	5	6	16	0	6	187	209
Southern	21	14	2	5	207,448	989	1,128	1	0	0	4	5	31	10	3	125	169
Arkansas	11	6	0	5	37,381	428	407	0	0	0	1	1	15	1	2	85	103
Mississippi	6	2	0	4	36,774	377	298	0	0	0	3	3	17	4	1	155	177
Southeastern States	0	0	0	0	0	49	88	0	0	0	0	0	1	0	0	20	21
Montana	6	4	0	2	29,951	254	269	1	0	0	2	3	1	0	1	45	47
Wyoming	18	12*	0	6	95,057	747	607	0	0	0	2	2	17	0	1	112	130
Colorado-Utah	14	1	1	12	82,976	330	112	0	0	0	10	10	15	0	7	151	173
New Mexico	48	14	25	9	246,594	753	607	3	0	0	3	6	19	0	10	87	116
California	54	36	1	17	215,916	2,349	1,846	0	0	0	17	17	59	0	6	479	544
Miscellaneous (Md., N. D.)	3	1	1	1	20,977	89	54	1	0	0	0	1	2	1	26	56	85
Total United States	860	468	85	307	3,665,012	43,901	42,947	27	0	6	161	194	1,565	76	261	8,493	10,395
Total previous week	947	508	71	368	4,102,369			30	0	4	175	209	1,538	86	245	8,332	10,201
Total December 30, 1950	814	458	60	296	3,135,702			29	1	4	139	173	1,138	73	211	6,586	8,008

Service wells included: *5, †11, 12.





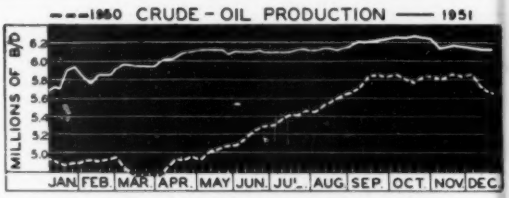


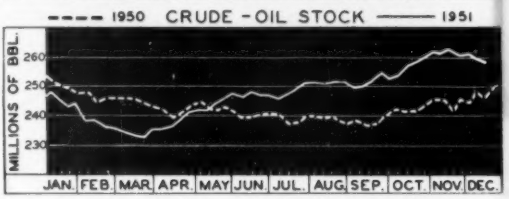
DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 29 crude oil	B. of M. Dec. demand	Dec. 22 crude oil
Alabama	2,800	2,400	2,800
Arkansas	77,615	84,000	77,665
California	988,500	995,000	988,900
Colorado	76,200	75,000	77,300
Eastern	56,500	61,000	57,000
Florida	1,725	1,600	1,775
Illinois	168,600	161,000	170,400
Indiana	32,000	31,000	31,200
Kansas	307,200	319,000	305,000
Kentucky	34,620	31,000	34,800
Louisiana	603,300	648,000	603,400
North Louisiana	113,750		113,850
South Louisiana	489,550		489,550
Michigan	42,300	40,000	37,800
Mississippi	100,165	102,000	98,410
Montana	25,000	26,000	26,000
Nebraska	6,000	8,000	7,600
New Mexico	148,625	155,000	148,625
Oklahoma	520,100	530,000	519,600
Texas	2,753,050	2,780,000	2,753,050
Dist. 1 (Southwest)	32,700		32,700
Dist. 4 (Southwest)	251,900		251,900
Dist. 2 (Gulf Coast)	163,300		163,300
Dist. 3 (Gulf Coast)	462,200		462,200
Dist. 5 (Eastern)	52,600		52,600
Dist. 6 (Eastern)	123,025		123,025
East Texas field	268,500		268,500
Dist. 7-C (West)	116,150		116,150
Dist. 8 (West)	956,825		956,825
Dist. 7-B (W. Central)	84,300		84,300
Dist. 9 (N. Central)	158,000		158,000
Dist. 10 (Panhandle)	83,550		83,550
Utah	4,300	5,000	4,400
Wyoming	186,000	190,000	189,000
Total United States	*6,134,600	6,245,000	6,134,725
Change from prev. week, down 125			
Canada	138,100		138,300

Total U. S. production January 1-December 29 †2,230,628,134 bbl.
Same period last year (crude plus cond.) 1,969,610,425 bbl.

*Not including 117,745 bbl. condensate. †Including 38,599,099 bbl. condensate.



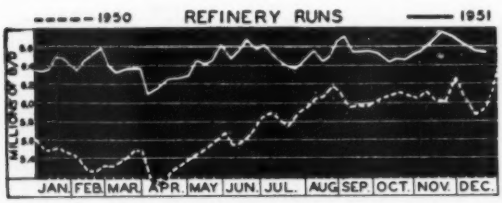


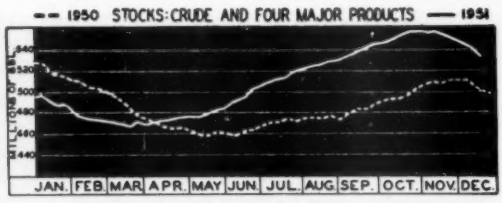
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

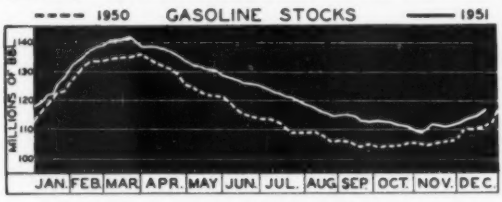
(Thousands of barrels)

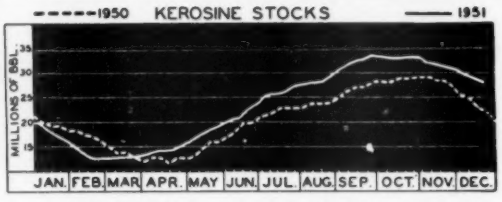
	Dec. 22, 1951	Dec. 15, 1951	Dec. 23, 1950
Pennsylvania Grade	1,925	2,048	2,186
Other Appalachian	1,626	1,712	1,451
Illinois, Indiana, Michigan	12,138	12,321	9,811
Arkansas	2,930	2,851	2,474
Louisiana	14,227	14,199	14,488
North	2,897	2,937	2,653
Gulf	11,330	11,262	11,835
Mississippi	3,491	3,323	2,564
New Mexico	6,993	7,097	7,158
Oklahoma and Kansas	40,834	41,285	39,001
Texas	124,734	125,220	120,878
East Texas	14,934	14,499	14,753
West Texas	53,731	54,388	47,392
Texas Gulf	27,420	26,931	28,574
Other Texas	28,649	29,402	30,159
Rocky Mountain	13,733	13,865	11,541
California	30,200	29,378	31,000
Foreign	5,280	4,997	8,247
Total	258,111	258,296	250,799

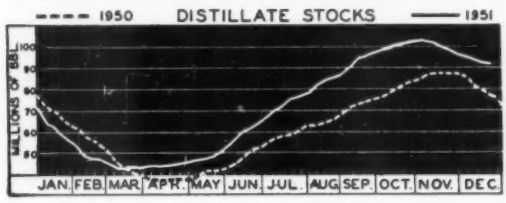
*Bureau of Mines.

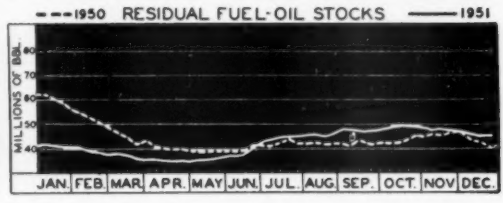


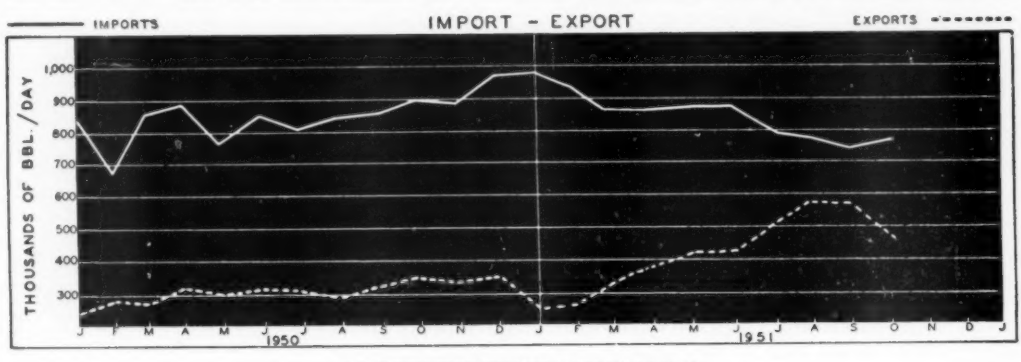










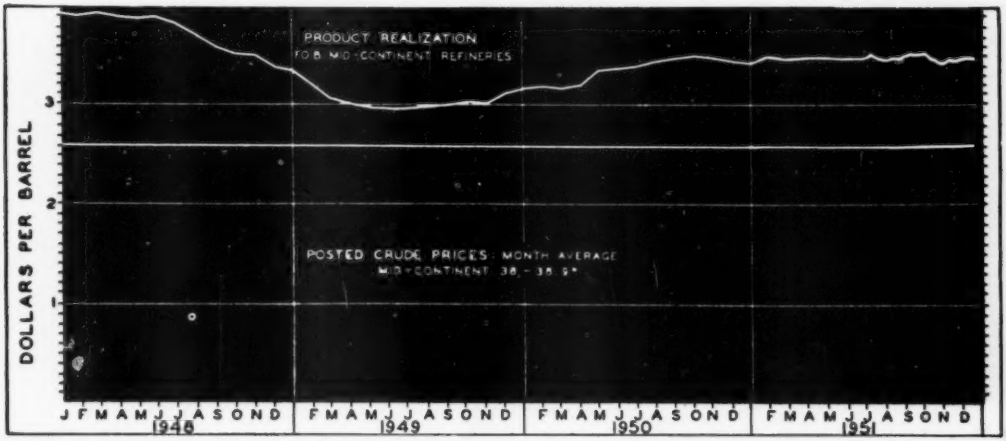


A.P.I. REFINERY REPORT, DECEMBER 22

(Thousands of barrels)

District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, December 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	1,032	418.8	58.4	338.6	252.3	24,209	9,638	29,488	10,090	951	386.9	44.0	254.7	234.4
Appalachian:														
District 1	100	41.4	7.3	13.9	12.1	2,844	519	887	580	95	42.0	5.2	15.5	11.1
District 2	79	32.0	6.3	8.6	19.4	1,281	359	313	286	65	32.0	5.3	7.0	16.4
Ind., Ill., Ky.	1,249	643.7	76.0	234.1	194.6	26,376	5,873	17,217	5,769	1,103	550.6	75.9	200.8	173.6
Okla., Kans., Mo.	542	300.6	10.6	134.3	64.8	12,967	1,588	11,259	1,891	514	274.5	18.6	121.2	71.4
Inland Texas	245	175.9	12.1	39.9	42.3	4,209	553	1,581	1,365	214	147.3	12.9	31.6	41.0
Texas Gulf Coast	1,576	726.6	149.0	367.8	236.3	18,272	4,501	13,597	6,244	1,506	674.6	128.0	375.2	283.2
La. Gulf Coast	521	240.6	44.7	115.0	49.1	6,906	2,443	3,164	1,877	499	235.2	52.8	132.8	64.2
N. La. and Ark.	58	26.7	3.9	6.7	9.4	2,486	754	1,225	155	69	28.1	8.3	14.6	9.9
Rocky Mountain:														
New Mexico	16	9.0		2.9	3.9	127		71	32	15	7.9	0.3	2.7	3.5
Other Rocky Mtn.	219	103.4	10.0	48.8	52.9	4,029	309	1,673	955	213	99.7	7.1	42.8	46.0
California	908	391.7	2.3	139.4	351.0	13,912	355	7,372	14,063	900	399.9	4.9	143.9	351.0
December 22, 1951	6,545	3,110.4	380.6	1,450.0	1,288.1	117,618	26,892	87,847	43,307	6,144	2,878.7	363.3	1,342.8	1,305.7
December 15, 1951	6,553	3,182.3	360.4	1,467.1	1,251.9	114,812	28,434	91,619	44,157					
December 23, 1950	6,159	2,867.9	371.4	1,348.0	1,245.0	112,631	21,819	73,273	39,914					

*At refineries including natural blended. †Finished and unfinished.



In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.47 for week ended December 22, $3.48 for previous week, and $3.50 for December 1950.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37-37.9°. †35° and above.

STARTING with this issue, price quotations will be as of Wednesday each week instead of Monday. The change in issue date and later printing schedules make it possible to give price information up to the middle of the week.

Gasoline price wars are flaring up again at service stations in sections of New Jersey. At the first of the year, most of the reductions were in counties in the northern part of the state, but there is some indication that the wave of price cutting is spreading to central and southern counties. Some suppliers are meeting competition by giving dealers an allowance of about 2 cents while others are reducing posted tankwagon prices.

Price reductions are not the result of excess gasoline stocks in the area. Total gasoline stocks in District 1 on December 22 were slightly less than on the same date last year. This compares with an increase of over 4,000,000 bbl. for District 2. High tanker rates will hold the gasoline movement from the Gulf Coast to East Coast to a minimum during the winter months. Regular gasoline, purchased on the Gulf Coast and moved to the East Coast at current spot tanker rates, would cost over 13 cents a gallon at New York Harbor. Some suppliers are posting 12.6 cents for tankwagon delivery to dealers in northern New Jersey.

All major products are tight on the Gulf Coast. Demand for residual for lifting at Gulf Coast ports has increased to the point where most of the heavy fuel from refineries in north and east Texas is moving to the coast for export.

Home-heating fuels are firm in the Group 3 area. The short period of warm weather at the end of the year has been followed by a cold wave that will bring another flood of shipping instructions.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 2, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10¼-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	9-9½	10-10.1	9
No. 2 straw fuel oil	8¼-8½	9-9.25	8
No. 6 residual	$1.65-1.75	$2.45-2.60	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6¾	6¾
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	31.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

EQUIPMENT MEN . . . in the News

Rockwell Reorganizes Sales Department

L. A. Dixon, vice president of Rockwell Manufacturing Co., has announced plans for the country-wide

M. J. HARPER

P. C. KREUCH

reorganization of the company's sales department. Five regional managers have been appointed to service the entire United States, effective January 1, 1952.

The eastern region will be under the direction of M. J. Harper with headquarters in New York City. The central region will be supervised by P. C. Kreuch with headquarters in Pittsburgh. The southern region will be headed by J. W. Northcutt with offices in Atlanta. The midwestern region will be under the jurisdiction of C. K. Madison with offices in Houston. The western region will be managed by H. Boezinger with offices in Los Angeles.

Rockwell will continue to maintain district offices in the major cities of the country as it has in the past.

Fluor Corp. Forms Foreign Subsidiary

The Fluor Corp., Ltd., of Los Angeles, has completed the formation of a wholly owned foreign subsidiary for the purpose of doing construction work in foreign countries, it has been announced by D. W. Darnell, president.

The new subsidiary, to be known as Middle-East Fluor, S. A., commenced operations in Saudi Arabia on January 1, 1952, under contracts that have been signed with the Arabian American Oil Co. Offices are located at 16A Avenue Central, Panama City, Republic of Panama, and Dhahran, Saudi Arabia.

J. S. Fluor, executive vice president of The Fluor Corp., who will also serve as president of Middle-East Fluor, S. A., announced that all stock of the new company, which was incorporated under laws of the Republic of Panama, will be held by the parent company.

Other officers and directors of the subsidiary include J. P. Wiseman, executive vice president and director; J. P. Kneubuhl, vice president; J. E. Winn, vice president and director; F. M. Stephens, secretary-treasurer; N. B. Culp, assistant secretary-treasurer; F. E. Fischer, assistant secretary-treasurer, and J. F. Gardner, director.

National Geophysical Holds Annual Meeting

The annual meeting of the party chiefs of National Geophysical Co., Dallas, was held at the Cosmopolitan Hotel in Denver, December 14-15.

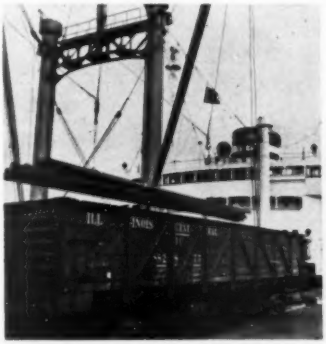
Technical subjects and new developments were discussed. Personnel from all over the United States gathered for the meeting.

Atlas Pipe Receives First Casing Shipment From Japan

The S. S. Atlas Maru out of Koke, Japan, recently unloaded at Port Houston the first shipment of oil-field casing to reach the Gulf Coast from the Orient. This first consignment for Atlas Pipe, Inc., of Houston contained 500 tons. The mills in Japan are now manufacturing line pipe and casing in an effort to help fill the tremendous requirements of the oil and gas industry.

American engineers are in Japan inspecting the finished products and assisting in setting up mill practice in conformity to American Petroleum Institute recommendations.

These shipments, which are to become a regular cargo at Port Houston, are due to arrive in semimonthly intervals.



First shipment of oil-field casing from Japan being unloaded at Port Houston.

Largey Is Appointed General Sales Manager

W. Edward Largey has been appointed general sales manager of Petroleum Engineering Associates, Inc., and Oil Properties Consultants, Inc., Pasadena, Calif., as announced by Florent H. Bailly, president of the companies.

Petroleum Engineering pioneered reservoir engineering and laboratory service. Oil Properties specialize in geological and engineering service.

Largey, who has long been a prominent figure in petroleum circles, formerly was advertising director of Byron Jackson Co. and Emsco Derrick & Equipment Co.

M. O. Johnston Interests Sold to Johnston Testers

M. O. JOHNSTON

W. M. TALYOR

M. O. Johnston has sold his group of operating oil-field service companies to Johnston Testers, Inc., of Houston. He will remain in the industry as a substantial stockholder and a director in the corporation which purchased his operating organizations.

W. M. (Bill) Taylor, who began his oil-field career in Eldorado, Kans., and migrated to California in the early 1920's and later became associated with M. O. Johnston in the middle 1930's, heads Johnston Testers, Inc., as president. Since 1942 he has been vice president and general manager of Johnston Oil Field Service Corp., an M. O. Johnston organization which headquartered in Houston and operated throughout the Gulf Coast and Mid-Continent areas.

M. O. Johnston group consisted of M. O. Johnston Oil Field Service Corp., Los Angeles, operating in California and Rocky Mountain states; Johnston Oil Field Service Corp. of Texas, operating in the Mid-Continent; M. O. Johnston Oil Field Service, Ltd., of Edmonton, Alta., Canada, operating in the Dominion of Canada; and M. O. Johnston Oil Field Export Corp. of Los Angeles.

Services are available through

Johnston Testers, Inc., which maintains service branches in all active spots in the United States and Canada and which exports worldwide.

Officers of Johnston Testers are: W. B. Taylor, president; J. E. Smith, O. W. Ward and T. M. Johnston, vice presidents; H. F. Junker, secretary-treasurer, and J. H. Hambrick, Jr., assistant secretary-treasurer.

Directors of the new corporation are W. B. Taylor, M. O. Johnston, E. C. Johnston, H. F. Junker, J. E. Smith, L. B. Martin, Ed Rotan, and Richard J. Kneedler.

Buffalo Forge Elects Two Assistant Vice Presidents

The directors of Buffalo Forge Co. recently announced the election of Theodore M. Dillaway and George B. Kellogg as assistant vice presidents.

T. M. DILLAWAY

G. B. KELLOGG

Kellogg started with Buffalo Forge in 1940, being first assigned to the Buffalo Pumps, Inc., factory at North Tonawanda. In 1942 he came to the Buffalo factory in production work and in recent years has been assistant production manager. He was employed at Western Savings Bank before joining Buffalo Forge.

Dillaway also joined Buffalo Forge in 1940 in the credit department. Following a period in the Federal and Marine Engineering sales department and machine-tool sales, Dillaway returned to the credit department where he was assistant secretary for several years.

The Buffalo firm produces industrial and commercial fans of all types; air-conditioning equipment, forges, centrifugal pumps for all industries, and a large line of punching, shearing, bending, and drilling machines for the metal-working industries.

U. S. Steel Promotes Mortimer, Bailey

Promotions for John L. Mortimer, district director, and R. Clay Bailey, field representative, in the public-relations department of United States Steel, have been announced by J. Carlisle MacDonald, assistant to the chairman of the board, in New York.

Mortimer was named district director of the Southeast district, in addition to retaining his former duties in the Gulf-Southwest district, which makes him director of the corporation's public-relations activities over the 11-state southern area from Texas to North Carolina. His headquarters will be at Birmingham.

Bailey was named associate director of the Gulf-Southwest district, which includes Texas, Arkansas, Oklahoma, and Louisiana. S. T. McGinnis was named associate director in the Southeast district, with headquarters at Birmingham. Gulf-Southwest district headquarters will be maintained at Houston.

Peerless Holds District Sales Meeting in New Orleans

Peerless personnel in attendance at district sales meeting were: first row: C. L. Nickel, Indianapolis; W. E. Griffin, Dallas; C. C. Cook, Atlanta; E. W. Lundy, Los Angeles; J. C. Bonsall, Los Angeles; C. H. Sortor, Fresno, Calif.; E. H. Lanthorn, Indianapolis; F. W. McCann, New York; S. M. Riordan, Los Angeles; R. H. Hull, Indianapolis. Back row: G. F. Twist, Los Angeles; B. A. Tucker, Los Angeles; E. H. Hansen, Fresno, and D. R. Rankin, Los Angeles.

New Orleans was the location during the last week of November 1951 of a meeting attended by all district sales managers and certain engineering and administrative personnel of Peerless Pump Division, Food Machinery & Chemical Corp. The meeting was directed by G. F. Twist, F.M.C. vice president and Peerless divisional general manager, and B. A. Tucker, Peerless divisional sales manager, acted as chairman.

The meeting covered a review of 1951 accomplishments, the introduction of several new types of pumps, the solving of difficult manufacturing and sales-service requirements arising from the country's defense preparations, and phases of the company's participation in defense effort.

Huffman Is Named Sales Engineer by Bryon Jackson

A. M. HUFFMAN

A. M. (Huffy) Huffman has been appointed sales engineer for Byron Jackson Co., Casper, Wyo., according to an announcement by B. A. Hilliard, sales manager of the oil-tool division. Huffman will represent oil-tool and Patterson-Ballagh divisions in Rocky Mountain district.

Huffman was formerly affiliated for 10 years with Standard Oil Co. of California in the drilling and production department. In addition, he was with Drilling Exploration Co. for 11 years, 5 of which were spent in Brazil. He has been with Byron Jackson since 1945, and has spent 3 of the past 6 years in South America.

Rice to Represent Web Wilson in South America

Appointment of H. G. (Beans) Rice as sales and service representative for Web Wilson Oil Tools in Venezuela and Colombia has been announced by Web Wilson Oil Tools, Inc., and its export representatives, R. J. Eiche & Associates, of New York and Los Angeles. Rice's headquarters will be at Maracaibo, Venezuela.

Rice has had wide experience in drilling, production, and materials procedure while employed by Shell Oil Co. as petroleum engineer and materials supervisor in both Mexico and Colombia. He recently concluded a 2-month visit with his new affiliates during which time he gained a good working knowledge of the construction, applicability, and merits of Web Wilson tongs, elevators, connectors, hooks, and other drilling and production tools.

Langford Joins Iverson As Machinery Representative

R. H. LANGFORD

T. D. (Hi) Collins, vice president and general manager of Iverson Supply Co., Tulsa, has announced that Roy H. Langford has joined the company as machinery representative and will be located in the Tulsa office.

Langford attended Tulsa University, prior to 5 years' service in World War II. Upon returning to civilian life he joined Ideco's supply store division where he served in various capacities, including that of district manager of Oklahoma.

Stewart & Stevenson Extends GM Services

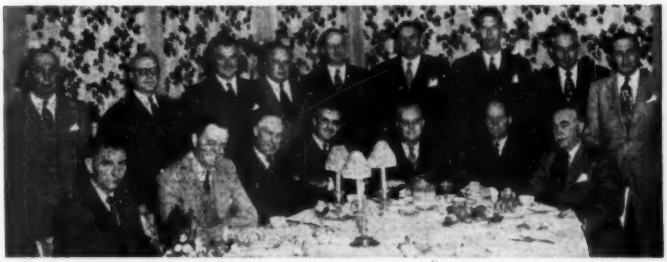
Stewart & Stevenson Services, a distributor for General Motors diesel engines, has been given an extension of its GM distributor franchise to include the West Texas and eastern New Mexico area and will soon open a new sales and service branch on the Midland-Odessa highway, according to an announcement by Joe Manning, vice president and general manager. The company now serves all industry throughout Texas.

E. E. (Slim) Childress, former chief mechanical engineer for Stewart & Stevenson, has been named district manager for the new operation. Harold Whiteley, formerly with Empire Machinery Co., will be parts manager at the new West Texas store.

In addition to GM diesel engines, Stewart & Stevenson also manufactures a complete line of oil-field rig-lighting equipment, utility units, pumping units, electrical generator sets, truck bodies, and acts as dis-

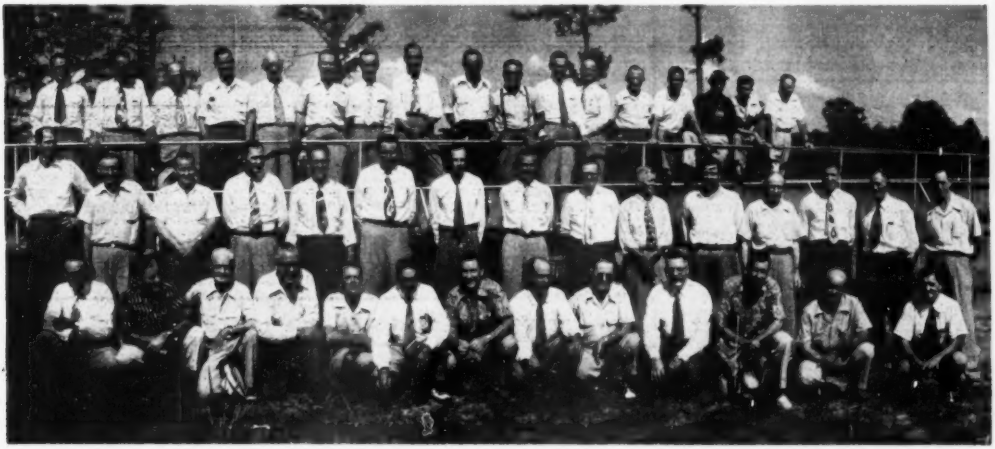
(Continued on page 144)

Top Dresser Operating Officials Meet in Chicago



Top management heads of the various Dresser operating companies, as well as the executive management officials of Dresser Industries, Inc., Dallas, held an executive training program recently in the Blackstone Hotel, Chicago. Those in attendance at this meeting were, left to right, standing: Willard Johnson, president, Magnet Cove Barium Corp., Houston; Robert H. Owens, president, Roots-Connersville Blower Corp., Connersville, Ind.; J. H. Rosecky, general manager, Torrance Plant, Ideco Division of Dresser Equipment Co., Torrance, Calif.; C. Paul Clark, president, Clark Bros. Co., Olean, N. Y.; Eric Flaschar, president, Stacey Bros. Gas Construction Co., Cincinnati; Otto Hammer, president, Security Engineering Co., Inc., Whittier, Calif.; W. O. Cook, general manager, Beaumont plant, Ideco Division of Dresser Equipment Co., Beaumont, Tex.; L. T. Wold, vice president, Kobe Division of Dresser Equipment Co., Huntington Park, Calif.; C. E. Ponkey, vice president, Ideco Division of Dresser Equipment Co., and general manager, Columbus plant, Columbus, Ohio. Seated: T. L. Moody, director of industrial relations, Dresser Industries, Dallas; R. P. Brown, director of personnel and organization planning, Dresser Industries, Dallas; A. R. Weis, president, Pacific Pumps, Inc., Huntington Park, Calif.; H. P. Boncher, general manager, Dresser Manufacturing Division, Bradford, Pa.; R. E. Reimer, vice president, secretary, and treasurer, Dresser Industries, Dallas; H. N. Mallon, president, Dresser Industries, Dallas, and J. B. O'Connor, executive vice president, Dresser Industries, Dallas.

Superior Iron Conducts Fall Sales Meeting



In attendance at the fall sales meeting of Superior Iron Works & Supply Co., Shreveport, La., were, front row: C. W. Brown, F. H. Gibson, J. T. Summers, L. A. Ver Bryck, R. L. Brock, M. L. Higginbotham, C. B. Watson, H. L. Reynolds, C. W. Reagor, John F. Pearce, R. D. Poindexter, F. M. Johnson, and Sam W. L. Backus. Middle row, L. Donald, A. B. Harrison, T. C. Poindexter, C. J. Hatcher, H. J. Van Dyke, E. Ball, L. W. Bower, E. V. Riley, L. L. Smith, W. P. Fort, H. C. Guynes, J. T. Shaw, J. T. Miller, T. J. Gibson, and Bill Grabill. Back row: H. A. Adley, B. G. Tatum, Gus Bell, D. W. Deupree, Jr., S. A. Pegues, W. L. Myres, H. F. Brooke, Homer Gray, J. D. McCammon, O. R. Thomas, J. L. Morgan, A. R. Wilson, W. A. Meagher, Ed Mather, J. E. Maricelli, J. O. McMurray, Jr., and H. E. Klapp.

CLASSIFIED ADVERTISING

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

DISPLAY CLASSIFIED
$12.00 a column inch one issue . . .
10% Discount three or more issues.

UNDISPLAYED CLASSIFIED 15c a word one issue. 10% Discount three or more consecutive issues. $3.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

EQUIPMENT FOR SALE

FOR SALE: Seamless casing and tubing new and second hand. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE: Westcott, Foxboro and Emco Gas Meters. Geo. R. Milner, Box, 124, Okmulgee, Oklahoma.

FOR SALE: One super model Wilson single drum servicing unit, 80 hp. Waukesha, 1,000' wire, all tubing tools, mounted on GM 4-wheel drive truck. $3600. Phone Rogers Pipe and Supply Co., Tulsa, Okla.

FOR SALE at our El Dorado (Oil Hill) Kansas Warehouse, one 10-20 McCormick Deering Steel Wheel Type Tractor—with Shaffer, Jr., Front End Winch, $350. Also Model FS-35 Cardwell Skid Type Pulling Winch Powered by Ford Motor, $750. No Masts. Cities Service Oil Company, Patridge, Bartlesville, Okla.

COMPLETE mounted Rotary drill rig, Ballbearing throughout. Steel Derrick 5½x10 Mud pump. 2⅞ drill pipe. Drill Oil or Water 2,000 feet. Fast rig. 2 men operate. Money maker. Box 106, Seminole, Oklahoma.

USED Baash-Ross block-hook combination, 150-ton, four sheave 1⅛" $2300. Good condition. General Equipment Co., Inc., 815 Daniel Bldg. 2-6764, Tulsa, Okla.

KEYSTONE spudder, trailer mounted, truck and tools. Located Washington County, Oklahoma. Working on seven hundred foot well. Box E-385, The Oil and Gas Journal, Tulsa, Oklahoma.

USED rotary and cable tool drilling tools, wire lines. E. A. Kelly, Box 861, Oklahoma City. Phone 5-6407.

AS IMPORTERS of Steel we can furnish you with European or Japanese Steel Products of all types. Let us have your inquiries Hemisphere International Corp., 1404 Hibernia Bank Bldg., New Orleans, La.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

IMMEDIATE SHIPMENT
PROPANE PLANT

Complete plant, Vaporizing and Mixing Equipment, including 18,000 gal. storage capacity in 3—6000 gal. tanks, ASME U69, 200 PSI WP.

PRESSURE VESSELS

10,400 gal., 7'x37', 300 PSI test.
8,200 gal., 6'x40'x2", 390 PSI.
3,500 gal., 5'x23'x¾", 200 PSI (4).
2,000 gal., 5'x13'7½", 106 PSI.
1,250 gal., 4'x14', 106 PSI.
1,200 gal., 42"x16'8"x5/16", 125 PSI, ASME U69.
1,050 gal., 4'x12'x½", 106 PSI.

HEAT & POWER CO., INC.
70 Pine St., Hanover 2-4890, New York 5
Machinery & Equipment Merchants

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

EQUIPMENT FOR SALE

PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 98434, P.O. Box 4193, Tulsa, Oklahoma.

SPUDDERS, rotaries, core drills. New and reconditioned equipment. Tools, cable, drill pipe, casing, tubing, pump jacks in stock. Everything for well service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

7500' OF API Full Hole 4½" Drill Pipe. Graded and tested by Sonoscope engineers. Milford Giffin, Giffin Hotel, Tel. 477, Hoisington, Kansas.

FOR SALE: Two 3000 bbl. Butler bolted tanks good condition. Can ship immediately. Wentz Fuel Oil Company, 1012 N. 16th St., Lincoln, Nebraska.

FOR SALE: Ten model WJD-3-A Briggs Lube Oil Clarifiers. Alfred B. Kern, 223 Wright Bldg., Tulsa, Oklahoma.

2300' 5½" Lapweld Casing 17/20 lb. used, but in good condition. $2.00 ft. Phone 88, Pawhuska, Okla.—Mr. Hudson.

5,000 GALLON LIQUID STORAGE TANK made by Mosher Steel Co. weighs 41,650 lbs. Over-all length 35 ft. 5 in.; outside diameter, 60 in.; shell thickness, 11/32; head thickness, 7/16; maximum working pressure, 80 lbs.; tests to 160 lbs. Write or wire Kenneth Hall, Oak Ridge, La.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 121—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE

1 Nixon 1½" Secondary Recovery Vacuum Unit—with or without 5 HP electric motor.

KREE OIL COMPANY
1001 Sinclair Bldg., Fort Worth, Texas
Phone FAnnin 3301

EQUIPMENT FOR SALE

THREE 4¾" x 30' Drill collars. American overshot. One 9" x 25' Drill collar. One elevator for drill pipe. Kiowa Drilling Company, Inc., 717 Union National Bank Building, Wichita, Kansas.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

20 BRAND NEW HERCULES POWER UNITS

20 Standard Closed Type RXC Power Units—6 cyl. gasoline engines (529 cu. in. disp.). Include water pump and connection, fan, manifolds, carburetor, air cleaner, electric starter, generator and battery ignition.

AT LIQUIDATION PRICES

Includes Pierce governor, Twin Disk clutch, cast iron radiator with removable copper core with tanks, exhaust pipe. Enclosed in a heavy-gauge sheet metal housing with removable slide panels. Mounted on formed channel base. All controls and oil pressure gauge are in control box on rear panel of engine housing.

Write, Wire or Phone Today

MYERS-SHERMAN CO.
1241 So. Illinois St., Streator, Illinois

FOR SALE
NEW WELDED PIPE

25,000'—4" OD, 10 ga (.134") wall, 5.533#, PE, 40' lengths
5,000'—8" OD, 10 ga. (.134") wall, 11.7#, PE, 40' lengths
5,000'—10" OD, 10 ga. (.134") wall, 14.6#, PE, 40' lengths

WRITE—WIRE—CALL

HORWITZ PIPE & STEEL COMPANY
Oklahoma City, Oklahoma **425 S. Western, Ph. 2-7591**

EQUIPMENT WANTED

WOULD like to purchase, or trade for, approximately 6,000' of new 2⅞" OD, Grade D seamless drill pipe with super shrink grip threads. Box E-530, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Walker-Neer 5-33 or similar rig without tools. Must be in good shape and reasonable. Ralph Stubble, Chatham, Ontario.

WE BUY well drilling equipment, machines, cable tools, pipe, etc. Turn your surplus equipment into cash. **Pressey & Son, Pueblo, Colorado.**

WANTED: Triplex Type Pumps, minimum 800 barrels per day capacity at 1,000 PSI and 0 to 10 PSI suction and up. 1" Regular Black Line Pipe; 1" long collar line pipe and 1¼" upset tubing. Must be in good condition. Lynch Oil Company, P. O. Box 814, Evansville, Indiana.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

WANTED FOR CASH

Oil Well Type Motors in ratings 15/30-20/50-25/65 or 35/75 Horsepower. Will buy other type motors.

ALLIED ELECTRIC & MACHINERY CO.
1007 Falls Bldg., P.O. Box 1338
Memphis 1, Tenn.

HELP WANTED

SHIFT SUPERVISOR—Responsible for supervision of Catalytic Cracking and Poly Plant operations, plus general supervision over process workers during shift. Must be experienced and thoroughly familiar with all phases of refinery operation. Location—Artesia, New Mexico. Write New Mexico Asphalt & Refining Company, Artesia, New Mexico, giving full particulars of qualifications, experience and references.

EXPLOITATION engineer, experience production geology and reservoir engineering problems, 4 to 5 years experience, age 28-35 years, married or single for position in South America. Climate and camp facilities desirable with strong independent oil company which has very promising future. Salary in line with experience capabilities and educational background. Box E-526, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Man some experience in Gas Measurement and Gas Testing. Location South Central Louisiana. Salary $247.50 per month. **House and Utilities Furnished.** State age, education and experience. Box E-531, The Oil and Gas Journal, Tulsa, Oklahoma.

SIZABLE INDEPENDENT OIL producing company needs an aggressive, experienced production man. Must be thoroughly experienced in drilling, completions and production. Will act as superintendent over Oklahoma properties. Technical background desirable. Age under 40 Excellent salary and opportunity for right man. Give full details first reply, which will be kept confidential. Box E-525, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Petroleum chemist or treating engineer with two to four years' experience in gasoline treating for technical service with large chemical company selling to the petroleum industry. Position involves considerable traveling in East and Middlewest. Please include details of education and professional experience, as well as a recent photograph, in first letter. Box E-508, The Oil and Gas Journal, Tulsa, Oklahoma.

DISTRICT GEOLOGIST: Aggressive independent oil company desires to hire experienced Geologist for Tulsa headquarters. Experience in West Texas-New Mexico are highly desirable. Box E-514, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIGN ENGINEER WANTED

Southern California manufacturer needs a design engineer, experienced in valves and fittings for the Oil Industry. Permanent position with excellent future. Please submit outline of formal training and experience. Mail to Box E-501, The Oil and Gas Journal, 211 S. Cheyenne Ave., Tulsa 1, Oklahoma.

HELP WANTED

REFINERY Chief Engineer 26-40 with experience in both process and mechanical engineering; should be qualified to supervise mechanics of modern refinery with catalytic operation. Contact The Derby Oil Company, Wichita, Kansas.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-264, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMOGRAPH. Excellent opportunity for experienced geophysicist with aggressive independent contract company to supervise contract crew. Salary dependent on experience. Write giving details, all replies held strictly confidential. Box E-513, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED petroleum refinery process engineer with good prior training in both process engineering and plant operation. If you have satisfactory training and experience the position is in line for top job in a Mid-Continent refinery. Box E-485, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Subsurface geologist with 3 to 5 years experience in subsurface mapping in North or West Texas area. Include details of education and experience. Replies confidential. Box E-520, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, chemical background, $650. Many other Rocky Mountain area oil jobs for experienced men or recent graduates. Professional Placement Service, 516 University Bldg., Denver, Colo.

ADMINISTRATIVE and field sales personnel. Engineering education and/or background necessary. Knowledge of petroleum and chemical industries desirable. Apply: The J. B. Beaird Company, Inc., P.O. Box 1115, Shreveport, Louisiana.

CONSTRUCTION ENGINEER

Graduate engineer with thorough experience in handling all phases of planning, contracting, and inspecting medium and heavy industrial and process construction. Must have knowledge of estimating practices and construction costs, plus a firm grasp of business aspects of engineering and construction. Must have demonstrated ability in management and coordinating work of subordinates. This is not a temporary or "emergency" job but a permanent position on the regular staff of the Engineering Construction Department of a major petroleum company. We are looking for a man, preferably in his forties, who is now earning $10,000 to $12,000 and is ready for greater responsibility. Write in confidence, to Mr. H. M. Overley, The Atlantic Refining Co. P. O. Box 7258, Phila. 1, Pa.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

BSME 1950. Major in power, Minor in Metallurgy. Five years USNR, age 27, one year experience in oil field. Desire position as experimental engineer or similar work, Houston area. Box E-529, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST desires change. Four years experience in southern Oklahoma, three with a Major Co. and one with an independent. Box E-517, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM CHEMIST, B.S.: 20 years experience in refinery laboratory and refinery operation. Available at once. Prefer Midwest or Southwest location. Box E-523, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

SITUATIONS WANTED

GRADUATE mechanical engineer, 2 years experience in drilling and production, desires work in production. Will locate in southwest, west coast or foreign. Will be released from Air Force latter part of January. Box E-512, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE MECHANICAL ENGINEER. Age 31, married. 6 years varied refining experience in staff, cost reduction, equipment selection, construction, and maintenance engineering. Desires permanent employment in refining or allied fields. Box E-524, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineering graduate of Texas University, desires change. Two years varied experience with drilling contractor. Box E-527, The Oil and Gas Journal, Tulsa, Oklahoma.

OVER 20 years experience geological, drilling and leasing; Williston Basin North and South Dakota, desires position with major or independent interested in exploration and development within that area. Box E-528, The Oil and Gas Journal, Tulsa, Oklahoma.

MAN, aged 46, member AAPG, thoroughly versed Louisiana geology, with actual experience drilling, leasing, curative work, desires connection with independent or small company operating Louisiana. Salary and interest open. Box E-522, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: Age 35, married, 13 years major and independent company experience in Texas and Louisiana Gulf Coast, Southwest Texas, West Texas-New Mexico, Colorado-Nebraska. Desire connection with Active independent. Excellent references. Box E-521, The Oil and Gas Journal, Tulsa, Oklahoma.

CIVIL ENGINEER, 3½ years experience refinery maintenance and construction with major oil company. Will consider foreign and domestic service. Box 1001, Sunburst, Montana.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

EXECUTIVE POSITION DESIRED

Tweny years Gulf Coast experience in geology, leasing, and producing oil. Presently employed, but desire change to an independent firm who is looking for an elert, aggressive man who can find you the oil. Want compensatory salary and opportunity of participating in profits. **Box E-515, The Oil and Gas Journal, Tulsa, Oklahoma.**

AVAILABLE
Production Superintendent or Chief Engineer

Graduate Petroleum Engineer, Geological option, middle thirties, advanced from roustabout through chief engineer to assistant superintendent. Association with major and 18,000 BD independent. Experience throughout Mid-Continent; Gulf Coast limited. Complete background in drilling, production and reservoir engineering, production supervision, and limited gasoline plant operation. Well known in Mid-Continent, top references. Available after thirty days notice, salary consideration reasonable, major or reliable independent. **Box E-516, The Oil and Gas Journal, Tulsa, Oklahoma.**

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationary Company, 115 South Cincinnati, Tulsa, Oklahoma.

EQUIPMENT MEN

(Continued from page 141)

tributor for Continental Red Seal engines, Chrysler industrial engines, Chicago pneumatic engines, Petter diesel engines, and Gardner-Denver pumps.

Murdock Promoted to General Sales Manager by Ethyl Corp.

Malcolm P. Murdock, manager of the central sales region of Ethyl Corp., has been promoted to general sales manager, Sanford M. Wagner, vice president in charge of sales, has announced. He will coordinate and direct the sale of antiknock compounds and a growing list of special-purpose chemicals.

Murdock joined Ethyl Corp. in 1933 as a field representative and rapidly rose to positions of increasing responsibility. He served successively as manager of the company's tune-up

M. P. MURDOCK

S. T. PRUITT

clinic, assistant division manager of sales offices in Los Angeles and Chicago, and on special assignment in New York. In 1947 he was appointed assistant general sales manager, which position he held until September 1950 when he became manager of the central sales region.

S. T. Pruitt, assistant manager of the central region, will succeed Murdock as manager. Pruitt joined Ethyl in 1930 in the Atlanta sales division as a field representative, became assistant manager of the Dayton sales division in 1941, and assistant manager of the central sales region in 1950.

BJ Purchases Assets of A. D. Cook Pump Co.

Byron Jackson Co. has entered into an escrow agreement with Oliver L. Bardes of Cincinnati, owner of A. D. Cook Pump Co., to purchase the assets of his organization located at Lawrenceburg, Ind., according to an announcement by E. S. Dulin, president, Byron Jackson. These assets will provide BJ with 150,000 additional square feet of manufacturing space and modern facilities which can be used for the production of Byron Jackson centrifugal pumps and Cook vertical turbine pumps.

It is anticipated that the present dealer organization of the Cook company will be continued under the new ownership.

Bovaird Supply Names Three Sales Personnel Changes

W. J. BOVAIRD

The New Year greeted three members of the Bovaird Supply Co. sales personnel with promotions and transfers to new locations. W. J. (Bill) Bovaird, James Kiker, and F. A. Rudrauff have been transferred to new positions with the pioneer supply company.

Bovaird was named assistant to the general manager of stores, it was announced by R. E. Batchelor, general manager of stores. He is being transferred to Tulsa from Midland, Tex., where he has been sales representative at the Midland office.

Kiker, who started with the firm at the Duncan store in 1948, has been transferred from Odessa, Tex., to sales representative at Midland. He has been at Odessa for 2 years where he was made store manager in 1950.

Rudrauff, field representative at Great Bend, Kans., succeeds Kiker as store manager at Odessa. He was store manager at Clay City, Ill., before being transferred to Great Bend in 1950.

Republic Flow Meters Adds To Field Engineering Staff

Republic Flow Meters Co. has established a Houston factory branch office to serve the rapidly expanding industries of the Texas Gulf Coast. George H. (Jack) Woodard returns to Houston as manager of Republic's Houston office, after several years as power-plant design and construction engineer with a large firm of consulting engineers, and as a project engineer at Republic's factory. Woodard's Houston staff will consist of factory-trained service and application engineers.

Other recent additions to Republic's field engineering staff include a new factory office in Seattle to service Washington, Oregon, and northern Idaho. Henry Weber, for many years a utility operating engineer and in responsible field and factory engineering capacities with Republic, has been named district manager at Seattle.

The St. Louis district office was moved to larger quarters at Clayton, Mo., where William G. Baker is in charge.

The Philadelphia district office has been expanded and relocated at Ard-

more, Pa. Louis C. Walter continues as district manager.

The Syracuse branch office provides local field and engineering service to Central New York state. William J. Angus is district engineer.

Republic's Buffalo branch office has recently been placed in charge of Charles T. Duffy.

Blaw-Knox Names Hauck As Sales Promotion Manager

Charles F. Hauck has been appointed manager of sales promotion of the Chemical Plants Division of Blaw-Knox Co., according to E. W. Forker, head of the division.

Hauck has had 15 years' experience in chemical engineering and water processing. His duties will be the development of new markets and the direction of advertising and technical information.

Tapecoat Appoints Coe For Pittsburgh Area

Russell H. Coe has been appointed to represent The Tapecoat Co., Evanston, Ill., on its coal-tar tape for pipe-joint protection, in Ohio, West Virginia, and western Pennsylvania, according to an announcement by A. W. Bohne, president of the company.

Coe has had broad experience in the pipe-protection field. He was formerly with Pittsburgh Coke & Chemical Co., in charge of coatings, and also was associated with Pipe Line Service Corp.

Coe's headquarters will be in Pittsburgh.

First Press Visit Made To Sigmund Pump Factory

Sigmund Pumps, Ltd., a leading manufacturer of industrial and domestic pumps in Europe, were hosts at a press visit to the Sigmund factory at Team Valley, Gateshead on Tyne, England, in late October. Along with other guests from local centers, the press was conducted by Sigmund directors and other executives on a tour of the factory, which also included the inspection of special pumps for Shell Refinery, Venezuela.

Sigmund Pumps Co., Ltd., factory at Team Valley, Gateshead on Tyne.

ADVERTISERS IN THIS ISSUE

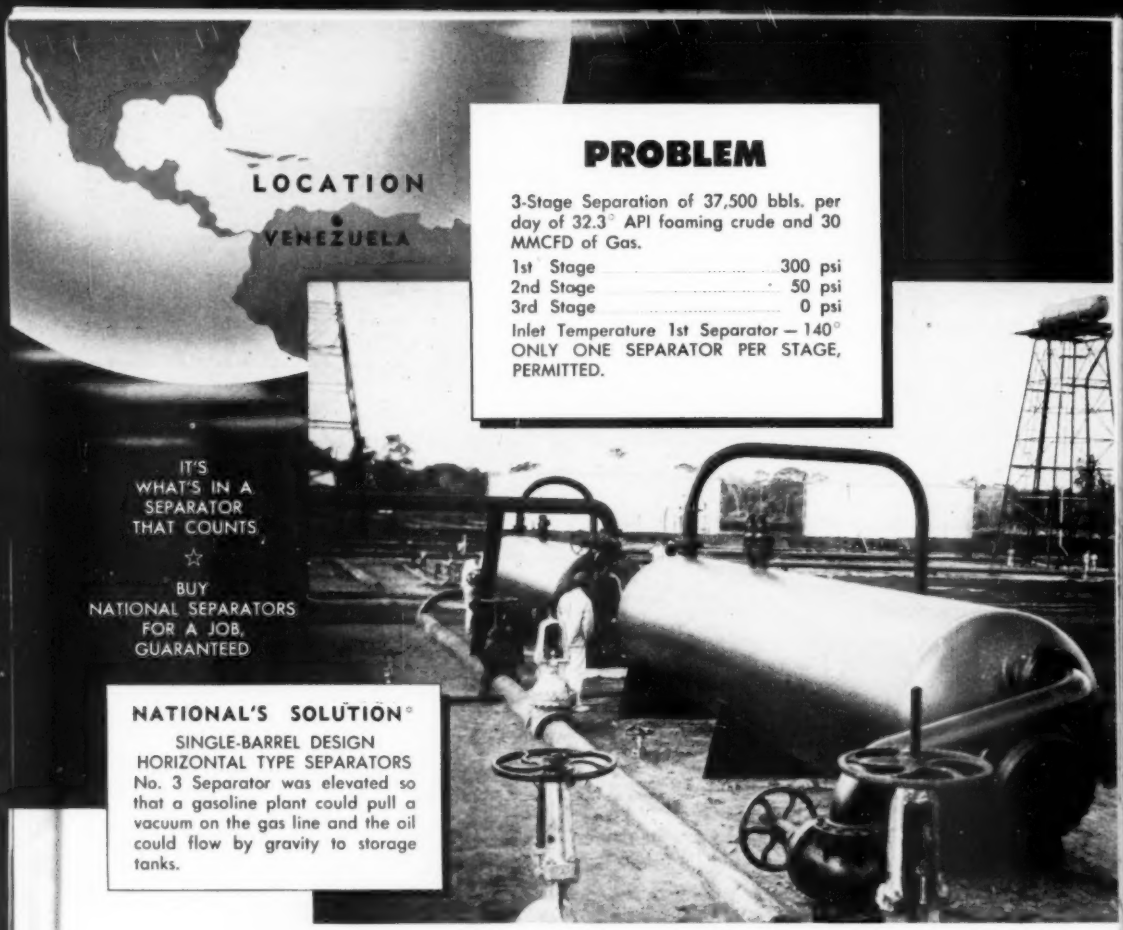
Cabeen & Associates Expands Organization

Wm. Ross Cabeen & Associates, exploration consultants, have announced expansion plans. Executive offices, headed by William Ross Cabeen, are located in North Hollywood, Calif. The Mid-Continent office has been moved to Oklahoma City, and a West Texas-New Mexico office has been established recently in Midland, Tex. Cabeen's staff first opened offices in Oklahoma City during October 1950.

S. T. Fee, formerly associated with Shell Oil Co. as division geologist, has joined the organization and will be located in the Mid-Continent office. Owen W. (Buzz) Fauntleroy, formerly with J. M. Huber Corp., Wichita, has been transferred from Oklahoma City to the Midland office. C. W. (Chuck) Allen will divide his time between the two branch offices.

"...There's nothing wrong with you that a higher allowable, a hundred-barrel well, or a Republican administration wouldn't cure!"

TABLE OF CONTENTS ON PAGE 37



PROBLEM

3-Stage Separation of 37,500 bbls. per day of 32.3° API foaming crude and 30 MMCFD of Gas.

1st Stage	300 psi
2nd Stage	50 psi
3rd Stage	0 psi

Inlet Temperature 1st Separator — 140°
ONLY ONE SEPARATOR PER STAGE, PERMITTED.

IT'S WHAT'S IN A SEPARATOR THAT COUNTS

☆

BUY NATIONAL SEPARATORS FOR A JOB, GUARANTEED

NATIONAL'S SOLUTION*

SINGLE-BARREL DESIGN HORIZONTAL TYPE SEPARATORS

No. 3 Separator was elevated so that a gasoline plant could pull a vacuum on the gas line and the oil could flow by gravity to storage tanks.

NATIONAL FURNISHED SEPARATORS WITH THE FOLLOWING SIZES AND OPERATIONAL CAPACITIES

	Press. on Separator psi	Bbls. oil per day	Std. Cu. Ft. Gas Per day
No. 1 Separator — 5′ x 22′-6″ long	300		22,700,000
No. 2 Separator — 5′ x 22′-6″ long	50		7,200,000
No. 3 Separator — 6′ x 20′ long	0	37,500	194,000
TOTALS		37,500	30,094,000

Had only one stage of separation been utilized at 300 psi, over 7,000,000 cu. ft. per day would have been liberated in the stock tanks.

* *As detailed in "TANK TOPICS," January, 1949.*

It's National

NATIONAL TANK COMPANY

TULSA, OKLAHOMA

HAZARD

LAY-SET PREFORMED

the Premium BRAND

Only the finest is branded "*Premium.*" Only the best gets the blue ribbon for unequalled quality. Only one is recognized as the grand champion winner which sets the standards of excellence . . . whether it's beef on the hoof, a beauty contest winner, or a brand of wire rope.

HAZARD since 1846 has produced premium wire rope . . . made better so that it will last longer, handle safer, and cost less to use. LAY-SET Preformed has been used —with excellent results—in every conceivable type of wire rope service. Its satisfactory performance has proved LAY-SET's right to be called—"*the Premium Brand.*"

There is a HAZARD distributor near you to serve you with this premium brand of wire rope.

ACCO *In Business for Your Safety*

AMERICAN CHAIN & CABLE

HAZARD WIRE ROPE DIVISION

ALSO MAKERS OF THE COMPLETE LINE OF Registered WIRE ROPE SLINGS

TRADE MARK

Wilkes-Barre, Pa. · Chicago · Denver · Houston · Los Angeles · New York · Odessa, Tex. · Philadelphia · Pittsburgh · San Francisco · Bridgeport, Conn.

...BY CONSISTENTLY USING LONG-WEARING B & B WIRE LINES

One test of a B & B line can demonstrate flexibility and ease of handling. But it's the repeated use that brings out the long life gained through high resistance to abrasion and fatigue. Preformed Yellow Strand Rotary Drilling and Casing Lines and Brodril Cable Tool Drilling Lines are engineered to deliver low *final* cost on today's tougher, deeper wells. Specify them. And for matching performance with sand lines, rod and tubing lines and other oil field ropes, see that they, too, are top-grade Preformed Yellow Strand.

Broderick & Bascom Rope Co., St. Louis 15, Mo.

Houston Factory and Branch: 9350 Market Street Road
Los Angeles Branch: 2441 Hunter Street
San Francisco Branch: 899 Bryant Street

THE CONTINENTAL SUPPLY CO.
Mid-Continent Distributors—Stores in All Active Fields

THE McJUNKIN SUPPLY CO.
Charleston, West Virginia

BRODERICK & BASCOM
Yellow Strand
PREFORMED WIRE ROPE